Pit and Quarry

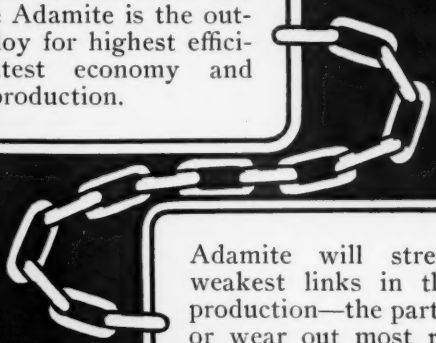
GRAVEL · STONE

NDLING · CRUSHING · SCREENING · WASHING

ADAMITE

PATENTED

For every purpose where conditions of wear and abrasion are most severe Adamite is the outstanding alloy for highest efficiency, greatest economy and maximum production.



Adamite will strengthen the weakest links in the chain of production—the parts that break or wear out most rapidly—and will make them the strongest, the longest lived links.

STEEL FOUNDRIES CO.

AUGUST, 1920

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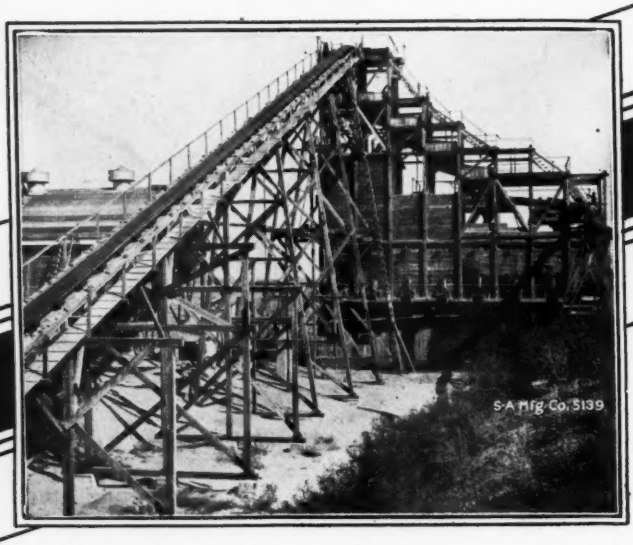
SPECIFY S-A CONVEYORS



Highly Important Feature

The means whereby the aggregate is transferred to the washing and screening plant is most important. No better method is available than the belt conveyor. Steadily and continuously the belt conveyor delivers material in a uniform flow to the screens.

S-A belt conveyors are particularly desirable for this service. They are thoroughly reliable and require minimum attention.

If you contemplate building a new plant or if you anticipate changes or extensions to your present equipment, communicate with S-A engineers.

STEPHENS-ADAMSON MFG. CO.
AURORA, ILLINOIS

"Repairs for a year, less than $15.00"

"We have worked our ERIE SHOVEL for more than a year, and our expenses for repairs have been less than $15.00.

"We have three different makes of shovels, and think more of the ERIE than of the other makes. Anyone needing a shovel will make no mistake in buying an ERIE." *WIGGIM CRUSHED STONE & SAND CO., Germantown, Ohio.*

If you want to find out which is the best revolving shovel on the market, just ask the Wiggim Crushed Stone Company, or any other ERIE owner.

Write for a copy of our Bulletin "Q." Address:

BALL ENGINE CO., Erie, Pa.
Builders of ERIE Steam Shovels and Locomotive Cranes, BALL *Engines*

ERIE Revolving Shovels — BALL Engine Co. Erie, Pa.

You Will Wonder—

After you have installed the self-rotating Hardsocg Wonder Drills you will surely wonder how you ever got along without them before. For no quarry or mine can afford to be without them.

Hardsocg Wonder Drills

permit faster drilling with less power and a minimum of upkeep. They can be operated either by compressed air or steam. One lever handle valve controls use of live air or steam. Piston hammer is not subject to breakage in operation; does not strike front end. Consumes very little air. Has very few parts. Skilled labor unnecessary.

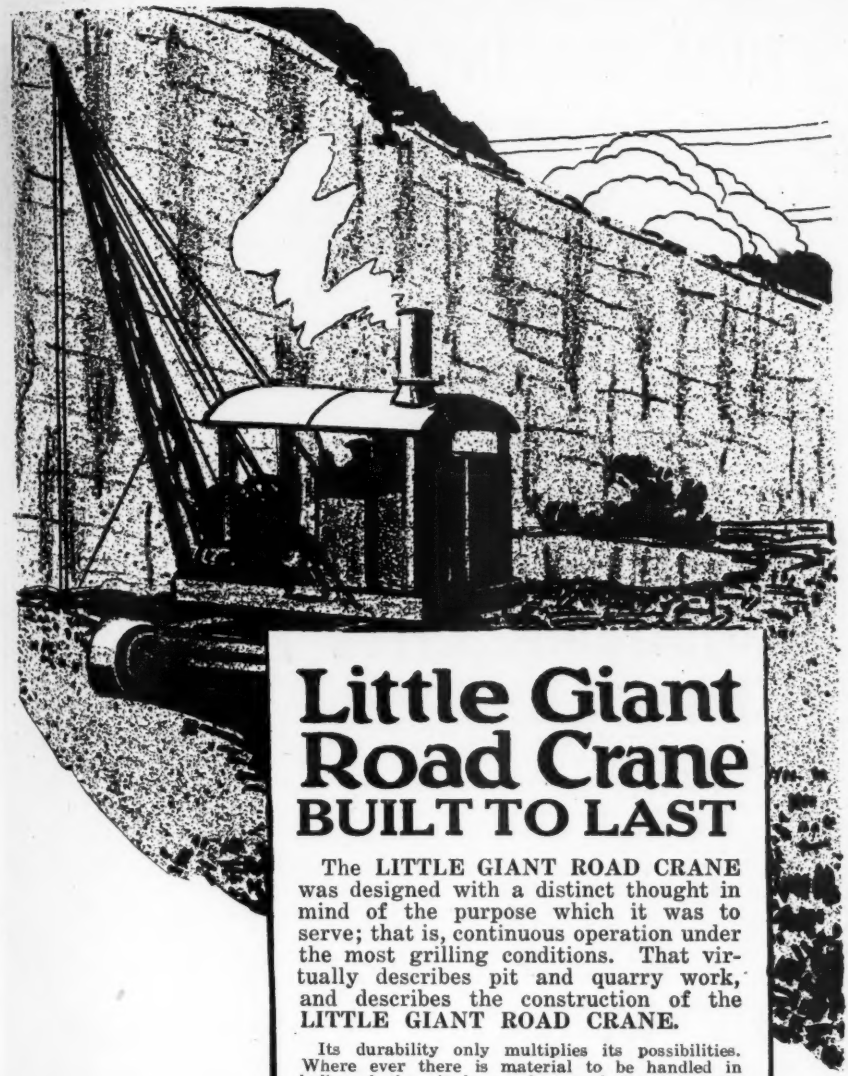
Features:

Self-rotating	Full rubber handle
Shock absorber	Exhaust control
Few parts	Automatic oiler

Bit retainer gives perfect satisfaction. Works on protected spiral compression spring—unbreakable.

Write for Our Catalog

Hardsocg Wonder Drill Co.
Ottumwa, Iowa



Little Giant Road Crane
BUILT TO LAST

The **LITTLE GIANT ROAD CRANE** was designed with a distinct thought in mind of the purpose which it was to serve; that is, continuous operation under the most grilling conditions. That virtually describes pit and quarry work, and describes the construction of the **LITTLE GIANT ROAD CRANE.**

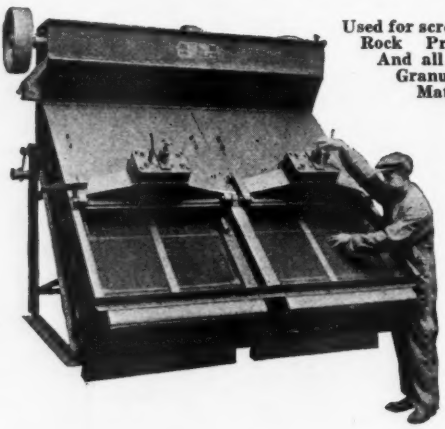
Its durability only multiplies its possibilities. Where ever there is material to be handled in bulk, whether it be sand, gravel or stone, the **LITTLE GIANT ROAD CRANE** affords an opportunity for profit.

ADDRESS DEPT. "C"

The Locomotive Crane Company
OF AMERICA
CHAMPAIGN · ILLINOIS

HUM-MER INCLINED SCREEN

Applies electro-magnetic vibration to a "drumhead tension" screen



Used for screening Rock Products And all Granular Materials.

Adjustable Screen Vibration!

The Adjustable screen vibration obtained with the HUM-MER Separator is **absolutely new** in the screening art.

This flexibility of screen vibration is unattainable with any screen that is vibrated by hammers, unbalanced shaft, eccentrics or other mechanical means.

The HUM-MER user can regulate the intensity of the vibration to exactly suit the condition of his material.

With the cover plates removed and the material passing down the screen in plain view, the operator, BY SIMPLY TURNING THE HAND-WHEEL at the top of the vibrator, can increase or decrease the vibration to suit any material.

Furthermore, where there is a varying moisture content, it is possible to increase the force of the vibration as the moisture increases.

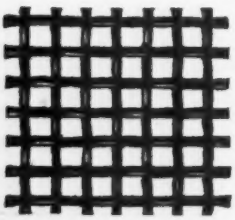
The ability to fit the vibration so closely to the requirement, results in the maximum tonnage and close separation on any condition of material.

LET US SHOW YOU WHAT HUM-MER VIBRATION WOULD MEAN ON YOUR MATERIAL.

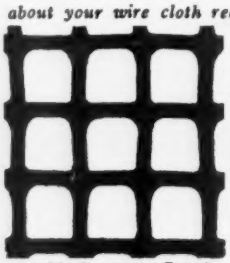
THE W. S. TYLER COMPANY

Manufacturers of Woven Wire Screens **Cleveland, Ohio**

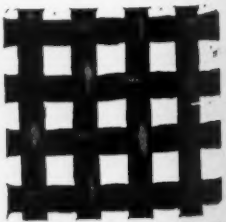
Write us about your wire cloth requirements.



6 Mesh, .054 Steel



3 Mesh. .080 Galvd.



3½ Mesh, .135 Steel

AUDUBON

WIRE PRODUCTS

for Industrial Uses

Wire Quality Is Never Accidental

The exceptionally long life of Audubon Wire Cloth under the roughest usage has surprised many equipment buyers. This endurance is not accidentally acquired. We put it into every square foot of all Audubon Products. Accurate workmanship is backed by the best raw materials that can be bought. Strength is insured in every stage of manufacture.

Such methods, together with our double crimp feature, have linked the name Audubon to a wire cloth of the most rigid construction and greatest durability.

What are your requirements? Tell us. We'll be glad to show you how Audubon Wire Products meet your needs best—in efficiency as well as economy.

Write for your copy of our interesting book.

Audubon Wire Cloth Co., Inc.
Audubon, N. J.

Three miles from Philadelphia, with direct railroad connections.

We Manufacture

Brass, Copper, Steel, and Galvanized wire cloth; partitions and guards of every description, Mine and Ore Screens, Coal and Sand Screens, Sieves and Riddles, and Wire Specialties.

More Work in Less Time

Shay locomotives do more work in less time than rod engines.

They start instantly, without the need of "taking slack."

They spot cars accurately because of their multi-cylinder engines and gear drive.

They pull with an even steady pull like that of an electric motor—avoiding damage to equipment.

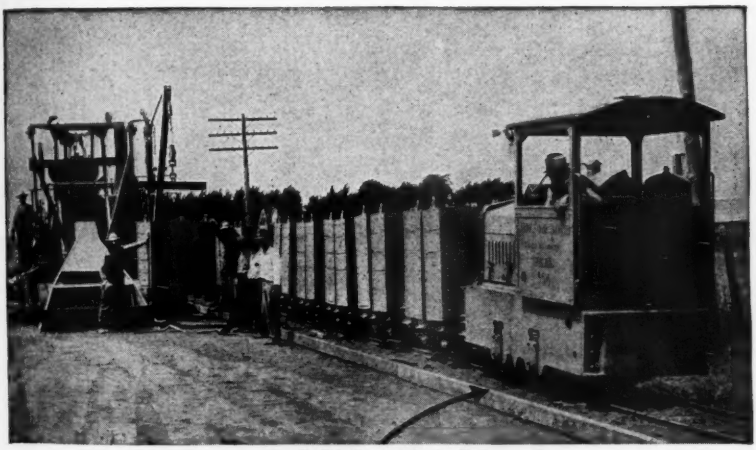
Shays mean increased production.

LIMA LOCOMOTIVE WORKS, Inc.

Lima, Ohio **30 Church St., New York**

WHITCOMB LOCOMOTIVES

ALL SIZES
FOR ALL CONDITIONS
POSITIVE GEAR AND FRICTION DRIVE
GASOLINE AND STORAGE BATTERY



SIX TON

3-Speed Positive Drive

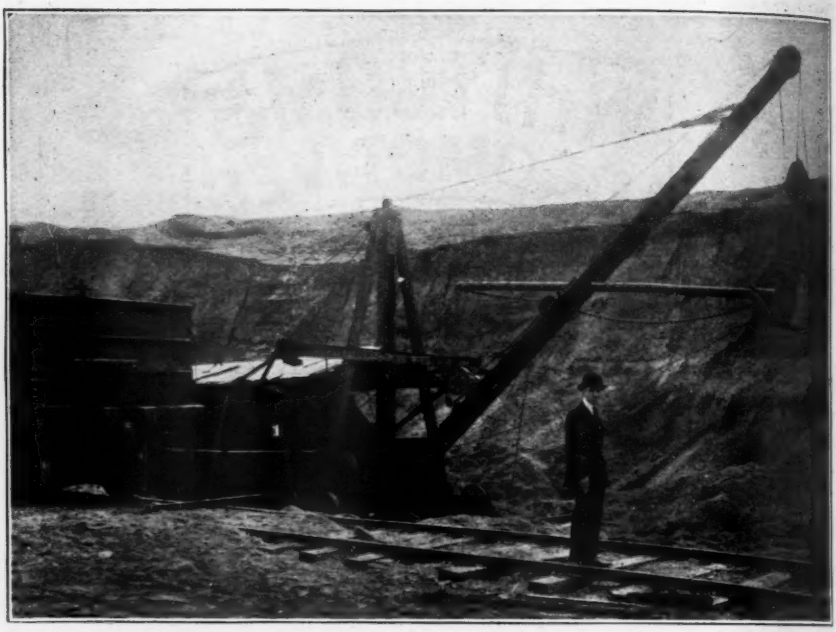
Road Contractors Special

This Six-Ton Gasoline Locomotive Will High Ball More Material to the Mixer Than Any Other Gasoline Locomotive Built of Its Weight.

Gasoline Locomotives, 2½ to 25 Tons. Storage Battery Locomotives, 2 to 8 Tons on Drivewheels.

GEO. D. WHITCOMB CO.

ROCHELLE **ILLINOIS**



"Very Satisfactory"

is what Holbrook & Skinner say of

The BAY CITY LOADER

For Pit and Quarry Service

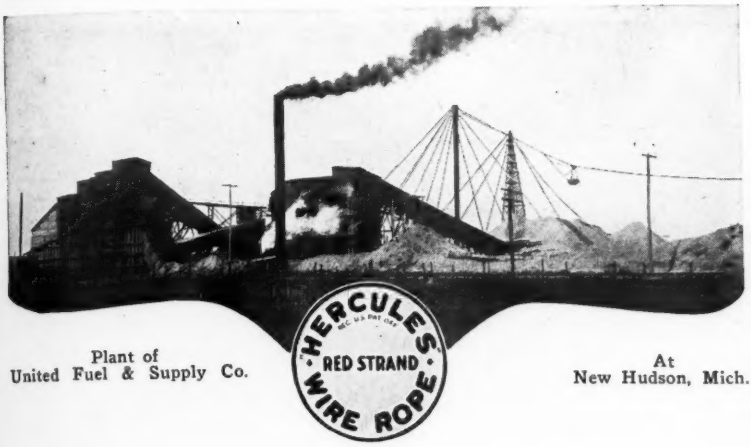
This machine is in operation loading gravel at their plant in Lansing, Mich. It is rendering excellent service and Mr. Skinner most willingly said so.

The BAY CITY Loader operates a powerful digging bucket that takes a big load at every bite. Handles a large amount of material at very low cost. Can be used for stripping, grading and loading sand, gravel or clay from bank into cars or wagons. Operating and upkeep costs small.

Write for full description.

BAY CITY DREDGE WORKS

BAY CITY - - - - MICH.



Plant of
United Fuel & Supply Co.

At
New Hudson, Mich.

ITS DEPENDABILITY HAS BEEN DEMONSTRATED

When you put on a Hercules (Red-Strand) Wire Rope you are not experimenting, for its ability to work successfully on sand and gravel handling machinery of all kinds has been fully demonstrated by actual service.

Whether you operate a small plant or a large one, HERCULES Wire Rope will help you reduce your operating cost. Its one red-strand is our guarantee of quality.

Catalog gladly furnished.

Established 1857

A. LESCHEN & SONS ROPE CO.

ST. LOUIS, MO.

New York Chicago Denver San Francisco

FOR PACKING

Hydrated Lime

Self-sealing Valve Bags Cut Costs

They fill rapidly to any specified weight and seal automatically. There are no ties to come undone, no ears to pull off, no waste, no dust and they can't leak.

Valve Bag packages are trucked and handled by stacks because they are regular in shape and size.

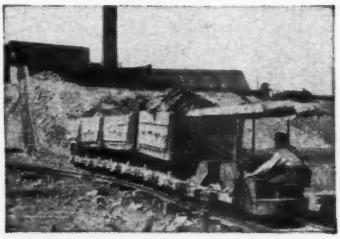
**Our Valve Bags save time,
labor, material, and space.**

When you want Valve Bags, let us quote prices

THE VALVE BAG COMPANY OF AMERICA

Toledo, Ohio

How Do You Move Your Cars?



Do you know what it is costing you to move your materials by your present methods?

—Figure it carefully

Do you know what savings can be made by a correctly applied system of electrical haulage?

—We will show you

Do you know the safety, speed, economy and high capacity of a good electric haulage system?

—We can tell you

Wouldn't you like a thorough analysis of your conditions, to see how they may be improved?

—We will make it

Wouldn't you like expert engineering advice as to selection of just the right equipment?

—Yours without obligation

Do you know that there is available to you from our varied line an exactly suitable system?

—Let us prove it

Do you know how our Service follows our every installation, to assure you perfect satisfaction?

—It's an important point

Wouldn't you like to see something of our complete line as shown in our Industrial Bulletin?

—Ask for Book No. 201-Q

GOODMAN MANUFACTURING CO.

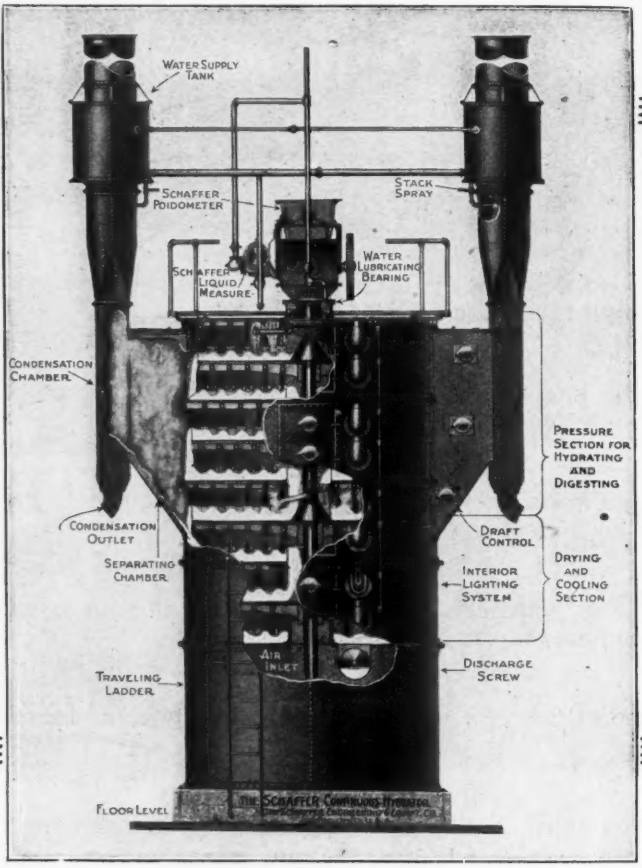
48th to 49th Streets, on Halsted

Chicago, Illinois

(85)

A Machine That Wonderfully Co-ordinates

The Essentials of Successful Hydrating

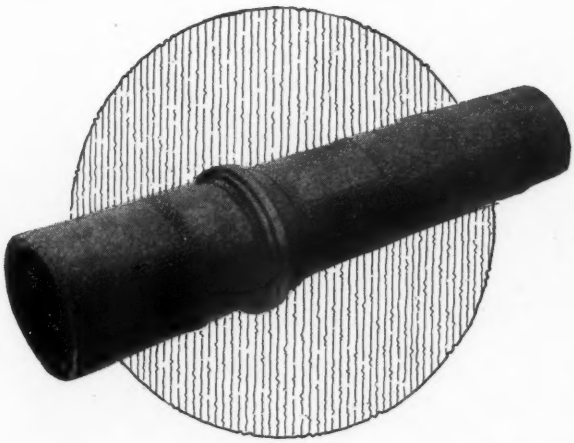


THE SCHAFFER HYDRATOR

Will operate continuously and automatically.
Will produce a superior quality of finished product.
Will operate with entire satisfaction on either high calcium or dolomitic limes.
Will effect a greater saving in labor.
Will permit of the greatest capacity on finishing mills.
Will prevent re-crystallization of very quick limes.
Will produce the greatest percentage of amorphous product.
Will give flexibility in operation to meet any market conditions.
Will properly co-ordinate with other working units of the plant.
Will occupy less space, capacity considered.
Will consume less power, capacity considered.
Will produce a product superior to any competing machine or process.
Will give satisfaction in every way.

THE SCHAFFER ENGINEERING & EQUIPMENT CO.

Peoples Bank Building **PITTSBURGH, PA.**



Making Operation Profitable with VULCAN Rotary Kilns

Finely divided rock can never be calcined in vertical kilns.

For this reason many excellent grades of lump rock cannot be used because they disintegrate in the presence of heat and choke up the grates.

Rotary Kilns handle successfully and economically all kinds of rock for calcining, roasting, drying or cooling.

If you are interested in reducing your production costs in any of these processes we wil gladly explain more fully.

VULCAN IRON WORKS

Designers and Builders of Rotary Kilns for 26 Years

1754 Main St., Wilkes-Barre, Pa.

New York **Chicago**

ALLIS-CHALMERS KILNS

When the huge United States Air Nitrate Plant at Muscle Shoals, Ala., was erected, kilns to burn the tremendous quantities of limestone to be used, formed an important consideration.

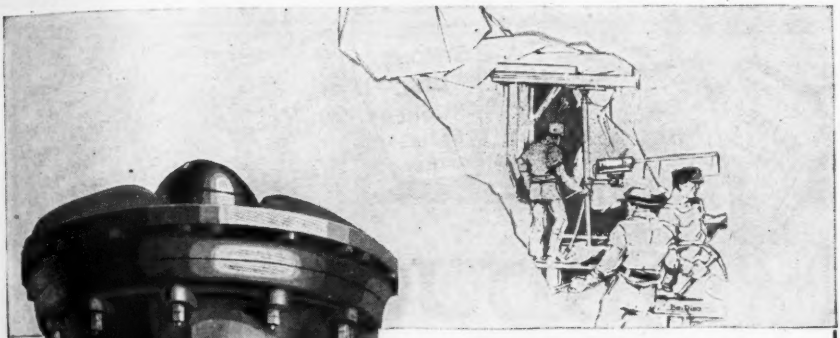
Accordingly a careful selection was made. Allis-Chalmers Kilns were part of the equipment, chosen by lime-producing experts.

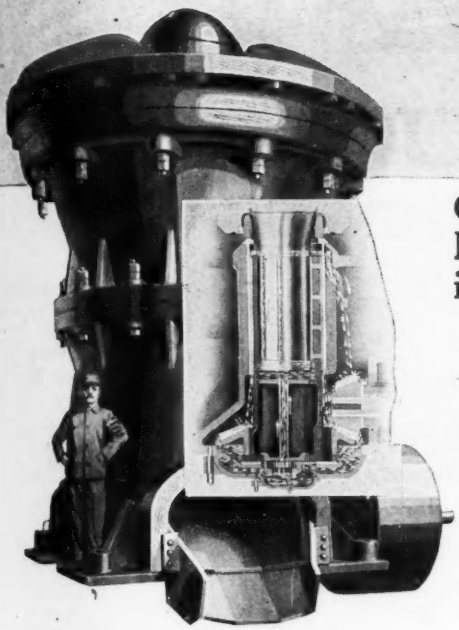
Bear this choice in mind for future guidance: Whatever you need for your plant can best be supplied by the Allis-Chalmers organization. Reliable products, free from fantastic features that simply breed complications.

Tell us what equipment you are in need of.

Write to

ALLIS-CHALMERS MFG. CO. Milwaukee, Wis.





Over 300 Superior McCully Gyratories installed since 1909

AND these machines are successfully operating on every grade of rock from soft lime stone to trap rock and iron ore.

The success achieved by Superior McCully Gyratory crusher is due to various reasons, chief among which are the suspended short shaft construction, force-feed lubrication and the freely tendered engineering and designing service which Worthington maintain at their Power and Mining Works, Cudahy, Wis. This service not only gives installation advice, but also dictates particular construction features which may be necessary to guarantee efficient, economical crusher service.

So when contemplating the installation of a crushing plant, be sure to avail yourself of Worthington advice and machinery. Both are standard.

Send for Bulletin P. M. 50

WORTHINGTON PUMP AND MACHINERY CORPORATION

Executive Offices:
115 Broadway, New York City
Branch Offices in 24 Large Cities

Oiling System

"Superior" lubrication is force-feed by means of spur-geared oil pump under constant head of oil, positively delivering ample supply at all times to eccentric bearing and gearing. This force-feed cannot be compared with systems using plunger pump and check valves, which are often unreliable.

Other Worthington Products:
Gyratory Crushers, Jaw Crushers, Air Compressors, Mine Pumps, Revolving Stone Screens, Ball and Tube Mills.

PUMPS—COMPRESSORS—CONDENSERS—OIL & GAS ENGINES—METERS—MINING—ROCK CRUSHING & CEMENT MACHINERY

WORTHINGTON

Dunne Works, *Holyoke, Mass.*
Blake & Knowles Works
East Cambridge, Mass.
Worthington Works
Harrison, N. J.
Laidlow Works, *Cincinnati, Ohio.*

Hazleton Works, *Hazleton, Pa.*

Gas Engine Works, *Cudahy, Wis.*
Power & Mining Works
Cudahy, Wis.
Snow-Holly Works
Buffalo, N. Y.
Epping-Carpenter, *Pittsburgh, Pa.*

REDUCTION MACHINERY

Gyratory and Jaw Crushers for Initial Breakers.

Symons Horizontal Disc Crushers as Intermediate Breakers.

Symons Vertical Disc Crushers as Intermediate or Finishing Crushers.

Ball Mills and Tube Mills for Finish Grinding

Crushing Rolls as Intermediate Crushers.

Pulsating and Revolving Screens.

Whether it be one machine or a complete plant we want the opportunity of figuring with you.

Our engineers are at your service in the design of your plant and are in a position to go into the smallest detail of the arrangement of your reduction equipment.

Our Machinery Now In Use In

Vermont
Connecticut
Massachusetts
New York
Pennsylvania

New Jersey
Maryland
Ohio
Indiana
Illinois

Michigan
Wisconsin
Rhode Island
Virginia
Kentucky

Tennessee
Alabama
Florida
Arkansas
Missouri

Iowa
Minnesota
North Dakota
South Dakota
Nebraska

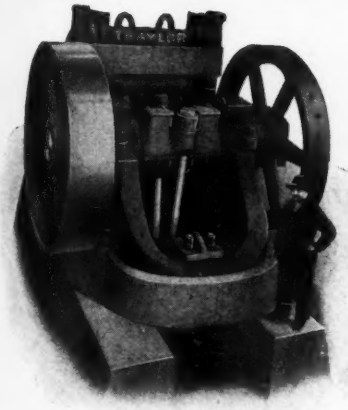
Kansas
Oklahoma
Texas
New Mexico
Colorado

Montana
Idaho
Utah
Arizona
California

Nevada
Oregon
Washington

CHALMERS & WILLIAMS

Main Office, 1430 Arnold Street, Chicago Heights, Illinois
Chicago Office, 208 S. La Salle St.



Look Your Jaw Crusher In The Back!

If it's a

Traylor "Bulldog"

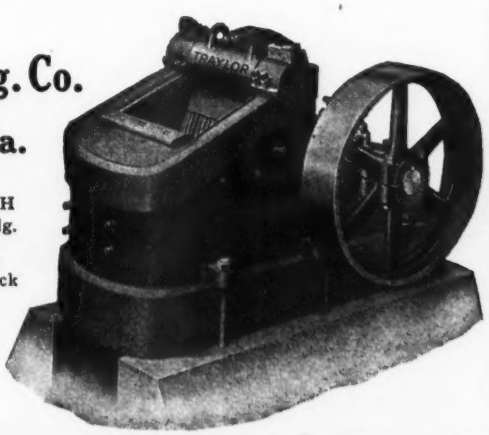
You'll see what's going on inside—what it is that eliminates 80% of the friction load and makes the "Bulldogs" the strongest, most economical, and most reliable jaw crushers on the market.

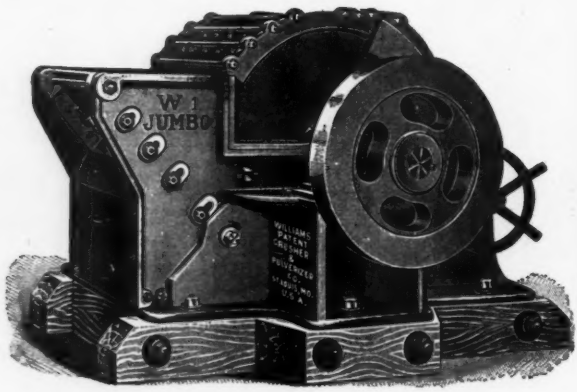
A lighter but far stronger pitman—a frictionless, self-aligning toggle system—a steel-banded frame of unequalled strength—these and other economy-producing "Bulldog" features are fully described in Bulletin QJX-1. Send for it.

Traylor Eng. & Mfg. Co.

Allentown, Pa.

NEW YORK 30 Church St.
PITTSBURGH 211 Fulton Bldg.
CHICAGO 1414 Fisher Bldg.
SPOKANE Mohawk Block
LOS ANGELES Citizens Bank Bldg.





WILLIAMS JUMBO CRUSHERS

Williams Jumbo Crushers are used in quarries as secondary crushers, taking 10-inch and under limestone, as it comes from the primary crushers, and reducing the material to 1½-inch, 1¼-inch or 1-inch and under in one operation. These machines are built in capacities ranging from 30 tons to 300 tons per hour. Many are now in operation. Complete details concerning these crushers are found in bulletin No. 85-A.

The Williams Patent Crusher & Pulverizer Company
General Sales Dept., 37 W. Van Buren St.,
CHICAGO

Plant
ST. LOUIS

67 Second St.
SAN FRANCISCO

TELSMITH REPLACES WHOLE REGIMENT OF CRUSHERS—

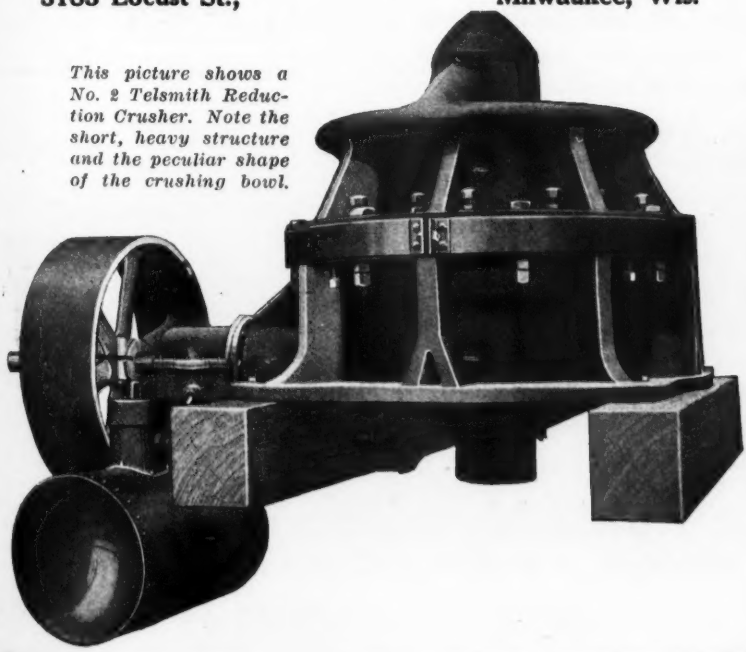
Have you ever seen a big gyratory breaker (No. 9, 10 or 12) followed by two No. 6 or No. 7½ machines, backed up by four No. 5 outfits—all re-crushing to 1½-inch size and under? Ever stop to think that two No. 4 Telsmith Reduction Crushers would do the work of those six re-crushers, at the same time crushing a finer and more uniform product? We say Telsmith will do it; and

WE CAN BACK UP THE ABOVE STATEMENT. Glad to mail you bulletin No. 4-F-15 (Telsmith Reduction Crushers) and catalog No. 161 (Telsmith Primary Breakers).

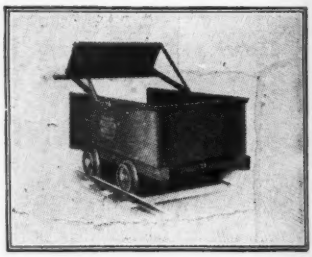
SMITH ENGINEERING WORKS

3183 Locust St., Milwaukee, Wis.

This picture shows a No. 2 Telsmith Reduction Crusher. Note the short, heavy structure and the peculiar shape of the crushing bowl.

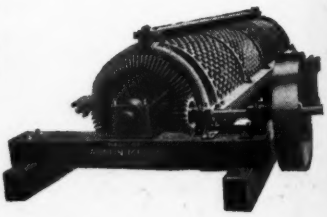


ELEVATORS, Screens Quarry Cars—or anything you may need in handling rock. The Austin line is complete with not only a great variety of machinery but embracing a wide assortment of styles and sizes. For instance :



Austin Elevators—one of which is pictured here—are made in various styles and sizes. It is possible to select an elevator which is especially adapted to your particular work.

The variety and completeness of the Austin line make it possible for operators to standardize on one brand and, therefore, to look to one source of supply for all equipment and service.

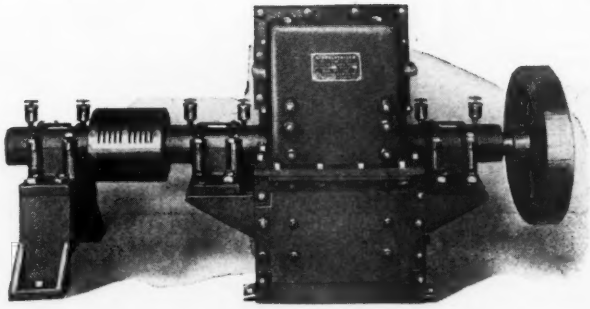


If you have not already done so, send for catalogs on the Austin line and get acquainted with the desirable features of Austin machines.

Austin Manufacturing Co.

New York CHICAGO San Francisco

ALLIED ALLIED CONSTRUCTION MACHINERY CORPORATION ALLIED



By the very nature of of the Work

it is called upon to perform a pulverizer must be much stronger than the material it handles.

Only STEEL will stand the stress

"K-B"

Is Built All-Steel

Catalog on request.

Trade K-B PULVERIZER Mark

K-B PULVERIZER COMPANY, Inc.

92 Lafayette Street, New York

CHEMICALS
SPELTER
GRASSELLI
COLORS
EXPLOSIVES
Have You Wondered?
"We cannot imagine how Grasselli Explosives have been able to obtain such remarkable results in quarry blasting. We would like to be shown."
Immediately a Grasselli service man boarded a train to the quarries operated by the company whose president wrote the above letter.
Have you, too, wondered at the results obtained through the use of Grasselli Explosives and Grasselli Service? Have you wondered how Grasselli Explosives were able to decrease blasting costs by minimizing the necessity of mudcapping and block-holing or of using a second charge to cut loose the "toe"?
There is a Grasselli representative ready to work with you toward accomplishing these results in your quarry.
The Grasselli Powder Company
Cleveland, Ohio
ESTABLISHED 1839
GRASSELLI
EXPLOSIVES
HOMER

Vital to the Basic Industries

WHEREVER the stubborn rock must be torn from its resting place, where coal is mined or metal bearing ores produced, there one finds the name of Du Pont looked upon as that of a leader.

One hundred and eighteen years of constant endeavor to improve every condition surrounding the use of explosives, the building up of a nation-wide chain of mills and magazines together with the establishment of highly efficient systems of distribution, has made us the greatest producers of explosives in the world.

Du Pont Explosives Service really serves. It extends into every state in the union and goes right down to the working face of every mine, there to advise as to more efficient Blasting Practices. It is yours for the asking.

E. I. du Pont de Nemours & Company, Inc.

Sales Department: **Explosives Division**

Wilmington, Delaware

USE GENERAL EXPLOSIVES AND SAVE MONEY

GENERAL EXPLOSIVES COMPANY
TRADE · MARK
U.S.A.

HOME OFFICE:
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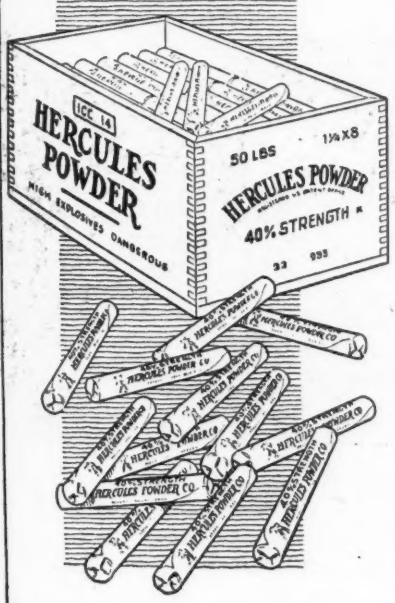
CHICAGO



Hercules Dynamite In the Quarries

The wide use of Hercules Dynamite in quarries means that these explosives *make good*—that they can and *do* increase production and cut costs.

Dependable explosives—explosives which are known to be of high and uniform quality—are in constant demand in the quarries—and the name Hercules stands for all of this.

Hercules Explosives can help you in your work. Every blasting problem will be quickly and efficiently solved by one or another of the many formulas and strengths of Hercules Powders.

Your own knowledge of local conditions will probably enable you to choose the grade of explosives best suited to your needs, but we are always glad to advise on this when asked.

Our service staff will answer your questions promptly and fully.

HERCULES POWDER CO.

Chicago	St. Louis	New York
Pittsburg, Kan	Denver	Hazleton, Pa
San Francisco	Salt Lake City	Joplin
Chattanooga	Pittsburgh, Pa	Wilmington, Del

Specially Designed Belts for Conveying

SAND AND GRAVEL

The problem of conveying these two commodities should not be trusted to any except a strong, sturdy belt, specially built to withstand severe usage which is to be expected in handling sand, gravel, crushed rock, stone, cement and similar products.

DESERT CONVEYOR BELT

By its construction of extra heavy duck, strong friction and its thick, tough cover, it is the ideal belt for use in quarries, cement plants, washeries and other industries where hard, abrasive articles are conveyed.

Our belting experts will gladly advise you with your Belting problems

QUAKER CITY RUBBER CO.

Manufacturers of Mechanical Rubber Goods

PHILADELPHIA 629 Market St. **CHICAGO** 182 W. Lake St. **PITTSBURGH** 211 Wood St.

NEW YORK, 53 Murray St.

Get your rock down in steam shovel size

You can not afford to spend time and money in preparatory work, with the expectation of getting the rock down in steam shovel size, only to find, after the shot, that a large proportion of rock has to be barred down, re-drilled and re-shot.

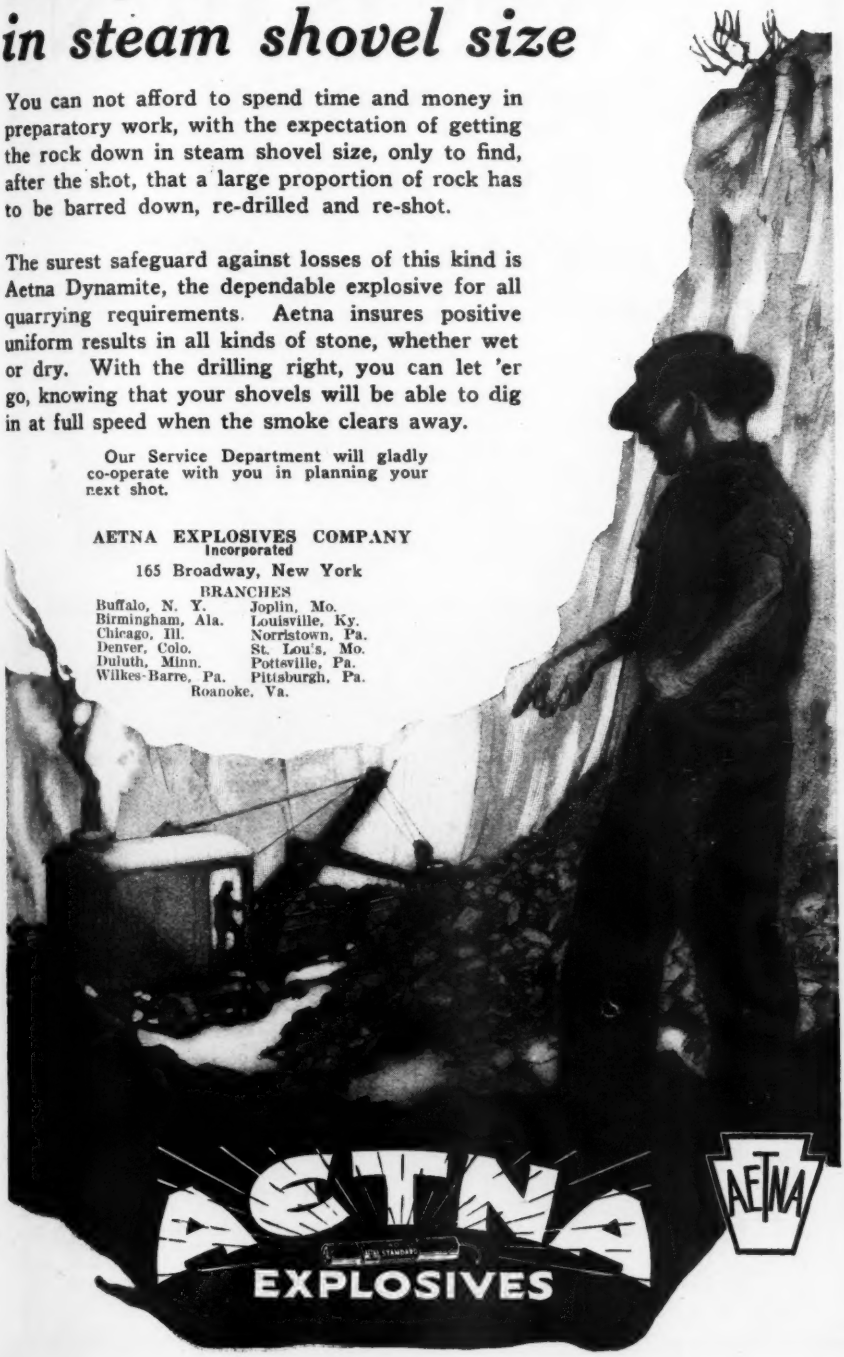
The surest safeguard against losses of this kind is Aetna Dynamite, the dependable explosive for all quarrying requirements. Aetna insures positive uniform results in all kinds of stone, whether wet or dry. With the drilling right, you can let 'er go, knowing that your shovels will be able to dig in at full speed when the smoke clears away.

Our Service Department will gladly co-operate with you in planning your next shot.

AETNA EXPLOSIVES COMPANY
Incorporated
165 Broadway, New York

BRANCHES

Buffalo, N. Y.	Joplin, Mo.
Birmingham, Ala.	Louisville, Ky.
Chicago, Ill.	Norristown, Pa.
Denver, Colo.	St. Lou's, Mo.
Duluth, Minn.	Pottsville, Pa.
Wilkes-Barre, Pa.	Pittsburgh, Pa.
	Roanoke, Va.

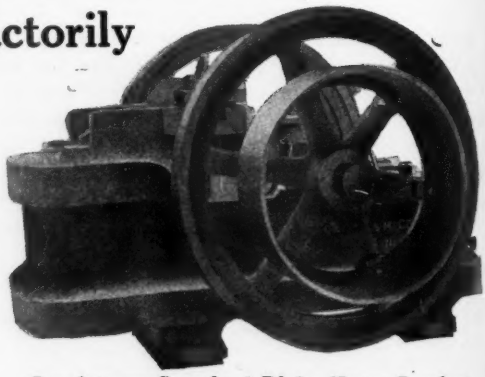


LEWISTOWN FOUNDRY PRODUCTS

Will satisfactorily meet your

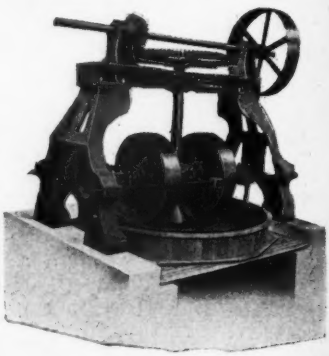
CRUSHING
GRINDING
SCREENING
WASHING
DRYING
ELEVATING

needs

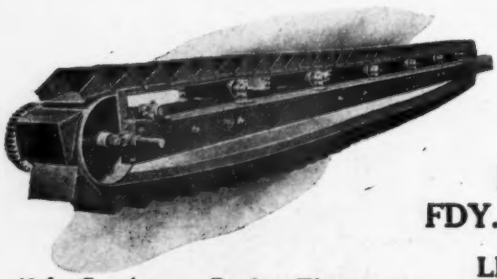


Lewistown Standard Blake Type Crusher

We manufacture a line of equipment for the above purposes in pit and quarry service and shall be pleased to furnish you with any desired information on whatever class of equipment you are interested in.



9-Foot Dry Pan



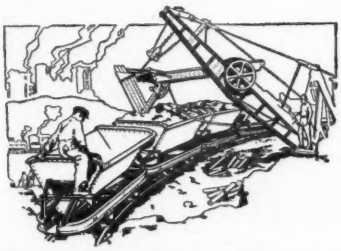
40-ft. Continuous Bucket Elevator

LEWISTOWN FDY. & MACHINE CO.

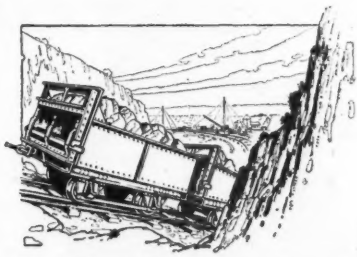
LEWISTOWN, PA.

EASTON

Industrial Railway CARS



Rocker Dump Cars of standard or special design and sturdy Easton construction for handling almost all classes of loose material. Also scoop cars, cradle dump cars, skip cars, quarry cars, and gable bottom cars.



We build all steel skip and quarry cars of various designs and to meet special requirements. Your requirements are met by the Easton line, whether standard or special.

Easton Engineering Service

Take advantage of Easton service—which advises freely, and can deliver promptly every detail of an industrial railway, from specially designed single cars to miles of track and complete trains. Ask for recommendations.

Church and Dey Streets, New York **Works: Easton, Pa.**

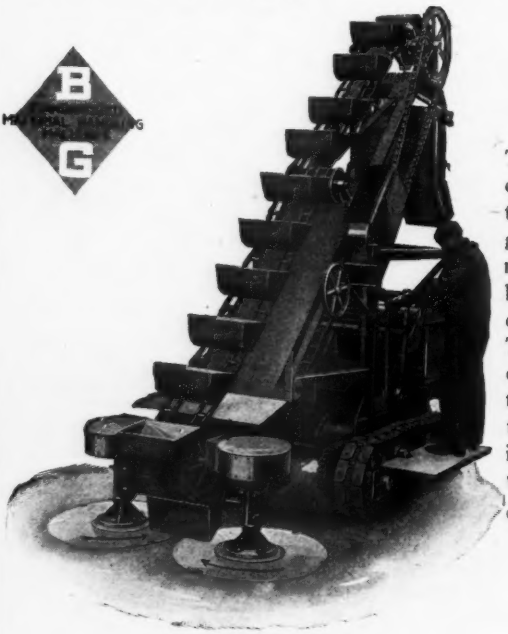
New York Boston Pittsburgh
Detroit Chicago Philadelphia

2074-E

Speed Up Your Loading

The car shortage is one of the largest factors in the present era of high prices and scarcity of raw materials. Immediate relief in the form of more cars can not be expected. The only answer is to keep the cars now available moving all the time. Delays in loading and unloading only make the situation worse.

Are you doing your part loading and unloading your cars promptly?



Model 20 B-G Self-Feeding Bucket Loader

This is the greatest machine on the market for the rapid loading of sand, gravel, stone and similar materials. Handles 75 cubic yards per hour and operated by only one man. Two features—the patented rotary disc feeder and the crawler type of traction put the B-G Loader in a class by itself.

Write for catalog N and complete information.

Barber-Greene Company

AURORA, ILLINOIS, U. S. A.

BRANCH SERVICE AND SALES OFFICES:

New York, Philadelphia, Norfolk, Boston, Hartford, Buffalo, Utica, Cleveland, Detroit, Indianapolis, Pittsburgh, Chicago, Milwaukee, Minneapolis, St. Louis, Omaha, Birmingham, Louisville, Kansas City, Denver, Salt Lake City, Portland, San Francisco, Los Angeles

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EXPORT DEPARTMENT

ALLIED MACHINERY COMPANY OF AMERICA

Men To Do This Work Are Hard To Get and Hard to Keep

Demand anywhere from $4.00 to $6.00 daily (each)—tire easily—delay loading of trucks—lessen output and profits.

The Jeffrey Radial Loader

Does away with 5 to 10 men—is built to stand the heaviest strain of handling crushed stone, sand, gravel, coal, etc. Digs into the pile 8 to 10 feet—no mechanical devices needed to bring material to the buckets.

Jeffrey Radial Loaders are built in two sizes. The **Type "K"** machine has a capacity of 1 cubic yard per minute—**Type "G"** loads 1½ to 2 cubic yards per minute.

Type "K" Loader loading 1 cu. yd. of sand per minute.

Catalogs Nos. 288-G and 309-B fully illustrate and describe the Radial Loaders and picture interesting installations. Write for copies.

The Jeffrey Mfg. Co.

990 North Fourth St.
Columbus, Ohio

BRANCHES:

New York	St. Louis
Boston	Birmingham
Philadelph	Denver
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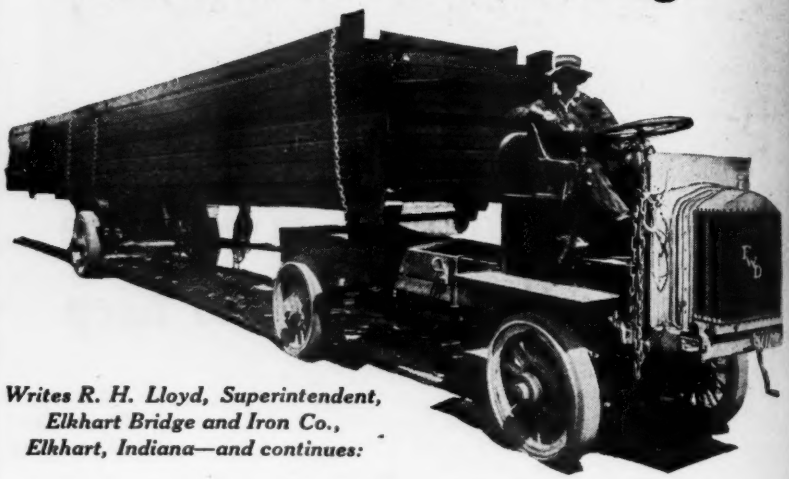
Detroit	Dallas
Cleveland	Montreal
Chicago	Buffalo
Los Angeles	

"'Pegs Right Along' Over Bad Roads and Hills on High"



Writes R. H. Lloyd, Superintendent, Elkhart Bridge and Iron Co., Elkhart, Indiana—and continues:

We use the FWD for carrying structural steel and iron. It carries its load always and arrives at destination O.K. We are well pleased.

The exclusive design and inherent strength of the FWD adapt it to all building work. It negotiates bad roads and makes rapid time on paved ones.

Its small turning radius, short over-all length and width, 56-inch tread and easy steering save valuable time in getting in and out of tight places.

These advantages are particularly evident in sand and gravel pits, quarries, in the construction of buildings, bridges and roads.

Equipment is furnished for every requirement of the engineering and building businesses.

FWD

Four Wheel Drive Auto Co.

Dept. 114

Clintonville, Wisconsin

Canadian Factory, Kitchener, Ont.

The Boys from the Front will tell you

TRUCKS

DUPLEX TRUCKS

BUILT FOR BUSINESS

Radiator Spring Suspension

Motor Meter in Radiator Shell

Two Wonderful Runs That Show the Remarkable Stamina and Power of the Duplex Limited

Duplex Limited carrying 3060 pound load from Los Angeles to El Centro via San Diego, 267 miles in 8 hours 26 minutes. Los Angeles to San Diego, 132 miles in 3 hours 49 minutes. San Diego to El Centro, 135 miles in 4 hours 37 minutes. Average speed 34 miles per hour. Entire distance without stop. No relief driver. Rain from Santa Ana to Oceanside. Speed limit observed in all towns in transit.

Duplex Limited carrying 3750 pounds of potatoes from New Orleans to Baton Rouge, 124.6 miles in 6 hours 55 minutes running time. Elapsed time 10 hours 10 minutes with 3 hours 15 minutes lost by ferry delays. The motor never missed and the water in radiator boiled only once and that after a 12 mile pull through "gumbo." After a 46 mile run in 2 hours to Port Allen the motor meter registered "warm."

HERE in this Duplex Limited is the definite practical achievement of the motor truck industry's aim to produce a truck that could freight 1½ to 2 tons at high speed.

This Duplex Limited is no mere city delivery wagon—but a strong, rugged *road truck* capable of hauling 3000 to 5000 pounds over city or country roads, and doing it on *schedule* time.

Designed and built for pneumatic tires—not merely equipped with them—the Limited travels easily and smoothly enough for even very fragile freight. Minimum vibration and shock saves wear and tear—and adds longer life to the truck.

Its motor is wonderfully rugged and powerful—and when turning over only about 1300 r. p. m. it drives the truck along at 25 miles an hour on high. Gear ratio is 5½ to 1 insuring high speed at minimum wear on motor and other moving parts.

Electrically equipped throughout—which means economy of gasoline as drivers will shut off motor when truck is not running.

The Radiator is suspended in patented Duplex Spring Suspension—which allows ¼ inch sidewise and 1 inch up and down movement before radiator touches anything solid. Prevents damage to radiator solderings and eliminates the great source of radiator leakage.

Lamps equipped with Nitrogen bulbs are mounted on radiator to prevent bulb damage by vibration.

Motor meter made part of radiator shell to prevent loss by theft.

Ball bearings used throughout—engineering tests show it requires 29 times less power to move a given load when ball bearings are used. *This means a gasoline saving due to less friction.*

Special flapper valve in oil filler pipe keeps sand and grit out of oil reservoir

From every angle of mechanical value and economical operation this Duplex Limited is a real truck—the very kind you've been looking for in your business.

Have the Duplex dealer demonstrate the Limited. It *makes good*—and will *cut your trucking costs and give reliable service.* Write for details.

If you have heavy hauling to do—write for booklets about the Duplex 4-Wheel Drive—America's Leading Heavy Duty Truck. "DUPLEX DOINGS"—The Truck Owner's Magazine sent free to all truck users. Address Dept. 129

Duplex Limited lifted clear of ground by wire around windshield frame. Strength of cowl means safety and less vibration.

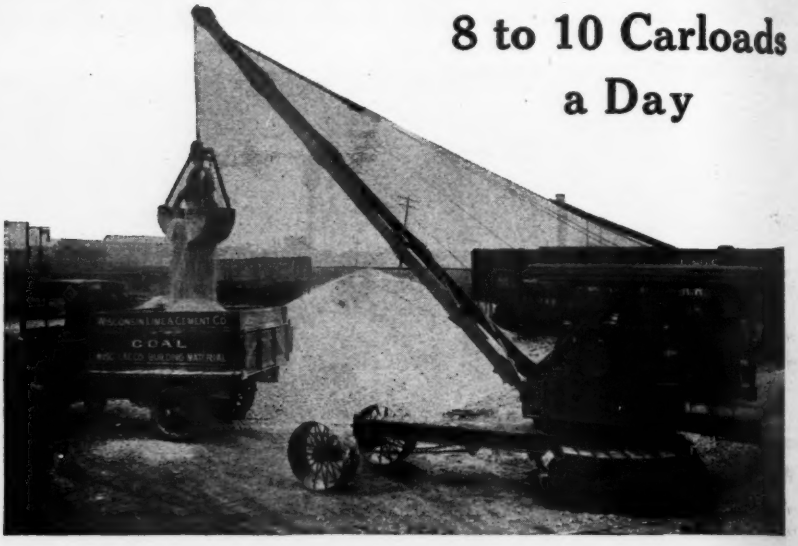
DUPLEX FOUR WHEEL DRIVE

Duplex Truck Company

Lansing • Michigan

One of the Oldest and Most Successful Truck Companies in America

8 to 10 Carloads a Day



THAT is what one Chicago concern, the Wisconsin Lime & Cement Co., is doing with a P & H Excavator Crane—unloading 8 to 10 carloads a day, with a man in charge who is not a high-priced licensed engineer.

The P & H requires no propping or stabilizing, and can be shipped without dismantling.

And it will do many things beside unload sand, gravel, crushed rock, and other loose materials.

Get the whole story in our Bulletin 5X.

PAWLING & HARNISCHFEGER CO.

50 Church St., New York
704 Stephen Gerard Bldg., Philadelphia
926 Whitney Central Bldg., New Orleans, La.
47 Fidelity Bldg., Pittsburgh, Pa.

EST. 1884

MILWAUKEE, WIS.

1241 Monadnock Block, Chicago, Ill.
Pittock Block, Portland, Ore.
1125 Central Bldg., Los Angeles
821 Monadnock Bldg., San Fancisco.

P&H — excavators — back-fillers - tampers

PAIGE

The Most Serviceable Truck in America

MOTOR TRUCKS

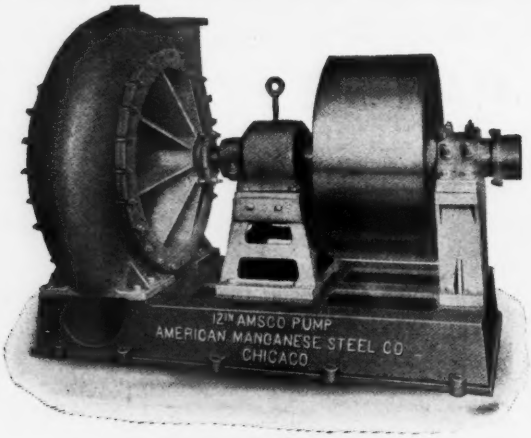
IT is unquestionably because of their rugged construction and enduring stamina that Paige trucks are proving themselves so eminently fitted to the needs of inter-city transportation.

On numerous motor express lines—notably on the well known Mason City route in Iowa—they are daily demonstrating their sturdiness and stability by the regularity with which they maintain exacting schedules.

The uniform dependability which Paige Trucks are exhibiting in this latest and most severe type of truck transportation may be taken as a reliable criterion of the service which Paige trucks render in all lines of truck transportation, city as well as rural.

PAIGE-DETROIT MOTOR CAR COMPANY, DETROIT, Michigan

Manufacturers of Paige Motor Cars and Motor Trucks.



AMSCO

Sand and Gravel Pumps Give Satisfaction

Of rugged construction, built for hard service. They stand up day in and day out, month after month. Their operating efficiency—percentage of days on active duty—is the reason they are bought in ever increasing numbers.

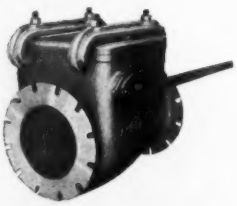
Manganese Steel for shells, runners, and side plates gives longest wear.

Slotted Flanges in side plates dispense with troublesome stud bolts. Solid ring gaskets are used.

Thrust Collar ball bearings reduce end thrust friction losses.

Balanced Runner and extra heavy shaft make the AMSCO Pump a smooth running machine.

AMSCO **Flap Valves**
Pipe
Elbows



Write for Pump Bulletin.

American Manganese Steel Co.

General Offices: 1875 McCormick Building, Chicago

Western Sales Office: Newhouse Bldg. Salt Lake City
Pacific Coast Office: Insurance Exchange Bldg. San Francisco, Calif.
Eastern Sales Office: Hudson Terminal Bldg. New York City

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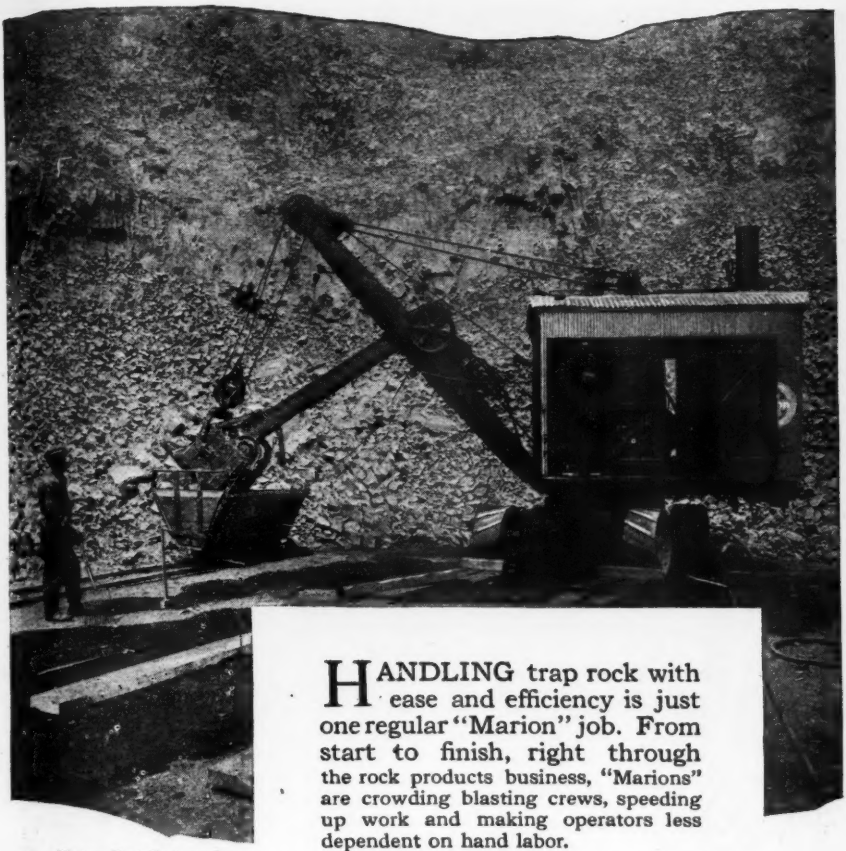


Union Building and Construction Co.
Passaic, N. J.

HANDLING trap rock with ease and efficiency is just one regular "Marion" job. From start to finish, right through the rock products business, "Marions" are crowding blasting crews, speeding up work and making operators less dependent on hand labor.

Wherever "Marions" are used their strong, rugged construction promotes steady, profitable operation under varying conditions. "Marions" come in a wide range of standard types and sizes adapted for use in all plants from the very large to the very small.

Over thirty-six years of sound, successful shovel-making experience is free for you to draw upon. And our policy of concentrated production assures every "Marion" customer quicker deliveries than formerly.

THE **Marion** STEAM SHOVEL CO.

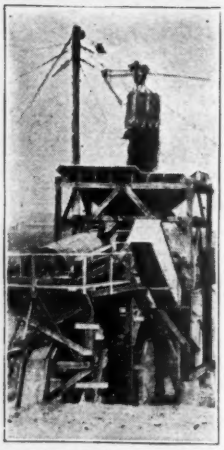
Established 1884 Marion, Ohio

New York Chicago Atlanta San Francisco

Billings, Mont., F. B. Connelly Co.
Dallas, F. B. Wright, Rush Bldg.
Denver, H. W. Moore & Co.
Detroit, W. H. Anderson Tool & Sup. Co.
Philadelphia, H. L. Cox, 19th & Cherry Sts.
Pittsburgh, J. W. Patterson
Portland, Clyde Equipment Co.
Salt Lake City, H. W. Moore & Co.
Seattle, Clyde Equipment Co.
Montreal, Toronto, Vancouver, Vancouver Mach. Depot, Ltd. F. H. Hopkins & Co., Ltd.

EVERYWHERE—RELIABLE
The Marion Steam Shovel Co.
ESTABLISHED 1884

SAUERMAN
DRAGLINE CABLEWAY EXCAVATORS



Whether Your Gravel Pit Is Large or Small, We Can Adapt Our Equipment to Your Exact Requirements

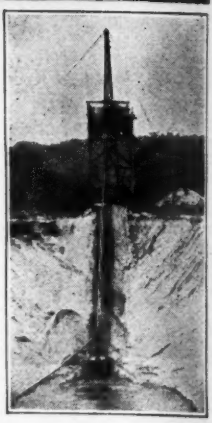
When deciding on equipment for operating a gravel pit, you will find it profitable to follow the lead of the many succesful sand and gravel producers who are using Sauerman Dragline Cableway Excavators.

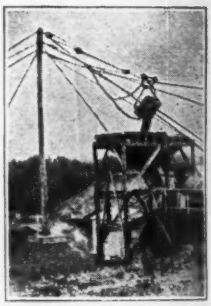
The cost of installing and operating our type of equipment is moderate, and our small capacity outfits are as economical for the owner of a gravel pit serving a local trade as our larger outfits are for the 1,000-ton per day producer.

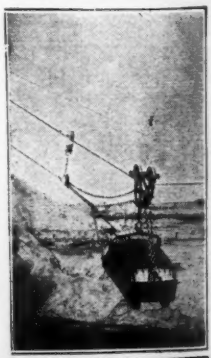
If you want to know whether a dragline cableway excavator would be suitable for your particular proposition, give us an idea of your requirements and we will submit our recommendations.

SAUERMAN BROS.

312 S. Dearborn St., Chicago.







-dig, convey, elevate & dump in one continuous movement under complete control of one man.

Pit and Quarry

A Monthly Journal for Producers of Sand, Gravel, Stone, Cement, Gypsum and Lime
Member Audit Bureau of Circulations

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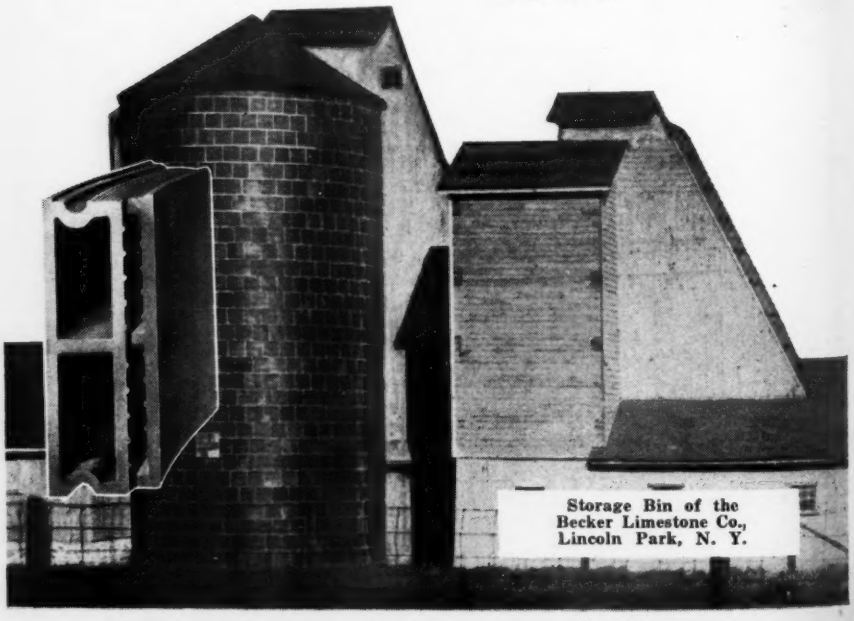

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Pit and Quarry

A Monthly Journal for Producers of Sand, Gravel, Stone, Cement, Gypsum and Lime
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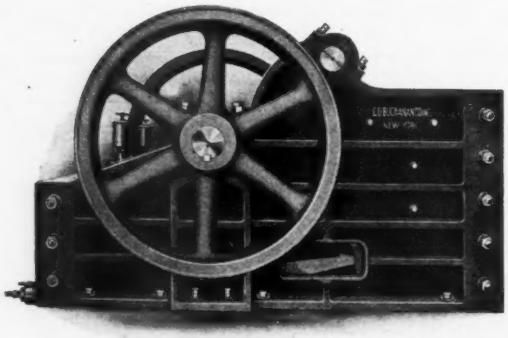
Crushers of Unusual Strength



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Pit and Quarry

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Is There But One Essential Industry?

Whatever else may be said of the coal operators, their sales ability cannot be questioned. The recent extension of Order No. 7 shows that they were able to "sell" themselves to the Interstate Commerce Commission.

In fact, they rather oversold. They remind one of the clerk who was called onto the carpet to show cause why he should not be cut off the pay-roll, and made such an eloquent plea for his job that he was not only retained but was given an increase in salary.

The hearing before the Commission, as we understand it, was to determine whether Order No. 7 should be allowed to run for the allotted 30 days, or

rescinded or modified in the public interest. The result was that it was not only allowed to finish its course, but was given an additional 30 days in which to work havoc with the open-car-using industries of the country.

Modifications were made, to be sure, but up to date no appreciable improvement has been noted from them by the petitioning industries.

So the production and distribution of coal have been officially designated as the paramount industry of the country for an additional 30 days, up to August 20th. What may be done after that time no one knows; but if the order should be continued in effect too long, it will serve to reduce the demand for coal as well as the general buying power, to the point where cars will of necessity be diverted to other industries.

It is too much to expect that, in a period of stress and insufficiency of facilities, such as the present, all industries will get a "fair shake." Some will almost of necessity be burdened more than others. But, as some one intimated at the hearing, why must a big, essential industry like the construction industry be disorganized and almost entirely suspended in order to provide coal for dance halls and moving picture shows?

Why should we shut down our plants in order that cars may be had to carry coal to the seaboard for export?

Why should we shut down our plants when cars are accumulating at some terminals faster than they can be apportioned and sent out to the coal operators?

Why should we face huge deficits for ourselves in order to allow the coal operators to cash in on a rising market?

Why should the policy of priorities and embargoes be adopted in times of peace, when even the coal men themselves do not agree that a national emergency exists?

And finally, why not, as was urged several times at the hearing, go back to the individual, local method of dealing between railroad and shipper, acknowledging the fact that no general rule can be made which will fit all cases unless the railroads are given much latitude in its application?

The railroad, no less than the shipper, would be glad to get from under a regime where every move is prescribed by rule. And in the end all would get just as far—if not more so!

Order No. 7 a Failure

Sutton States Some of Its Shortcomings to the Commission

IN MAKING application to the Interstate Commerce Commission for a hearing on the merits of Order No. 7, E. Guy Sutton, business manager of the National Association of Sand and Gravel Producers, stated that whatever salutary effect the order was intended to accomplish had failed of realization. He based this statement on the following facts:

That terminals are congested;

That coal prices have not been lowered;

That the transportation facilities of this country have been turned over to one industry to supply its product to manufacturers and others engaged in economically non-essential callings, while for lack of this same equipment, or a part thereof, other industries, of unquestioned economic essentiality, are facing ruin;

That these industries thus affected are rightfully entitled to their proportionate share of the available equipment which this order denies them;

That the effect of this order violates two fundamental principles;

First—When a shortage of transportation facilities exists, as is the case

at the present time, the shortage should be borne by all shippers pro rata;

Second—Priorities and embargoes are contrary to all sound business principles;

That at this critical period, to penalize and paralyze other industries in favor of one industry, and at the same time penalize and paralyze the nation's vital construction and building program, is to create a condition economically so unsound as to challenge the immediate attention of those interested in any way in the future welfare of this country.

Coal Men Not a Unit

One of Them Urged the Withdrawal of Order No. 7

GEORGE H. CUSHING, secretary of the American Wholesale Coal Association, speaking at the I. C. C. hearing, urged entire withdrawal of Service Order No. 7. He asserted there was no shortage of coal nor shortage of production. He said there was bad distribution of coal, but that that was wholly beyond the power of the order to correct. He declared that, although the railroads were in the worst condition, perhaps, in their history, the production of coal at this time was eight weeks ahead of the schedule.

"Yet in the face of that this order was issued," he said.

Cushing further asserted there was a sufficient amount of equipment to move coal and other commodities transported in open top cars. In explanation of why the public utilities were short of coal he said they had not bought because the contract price was too high. Government interference with the coal industry, he said, had brought on a panicky condition and this had helped boost prices. He said he would have taken advantage of such a situation if he had had coal to sell.

John Rice Was There

He Analyzes the Situation for the Producers of Crushed Stone

JOHN RICE, president of the National Crush Stone Association, was present at the hearing before the Interstate Commerce Commission and subsequently he sent out to the members of his organization the following statement:

The whole problem turns on whether there is a critical coal shortage. Some testimony, which presumably is well informed, says there is no shortage, except a very temporary one, which will be overcome within a short time. Other well informed witnesses testified that there has never been such a critical situation in the history of the country. It all turns on these facts. There seems to be no question that there should be some method of supplying coal to certain sections of the country, such as the northwest, depending upon lake shipments, and that the public utilities of the country should be supplied. It is equally true that there is no need that these particular sections should have 100 per cent allotment of coal, but the difficulty is the machinery by which this can be accomplished in a short time.

The problem which the Commission must face is a most difficult one and can be readily appreciated by any one who is not so narrowminded as to believe that his own interest is the only thing at stake. Every one can suggest remedies for the purpose of improving his own situation, but no one seems to be able to suggest a remedy which meets the entire situation.

I urged greater discretionary power to the railroads and this thought was supported by a number of subsequent witnesses. Chairman Clark then volunteered the statement that it was rather remarkable that the railroads had requested the commission to use its power to handle this critical situation and now there seemed to be a unanimity among the people present, by reason of their applause, to turn the responsibility back to the railroads.

Will Continue to Fight

Johnston Tells Commission Every Remedy Will Be Sought for Relief

VO. JOHNSTON, president of the National Association of Sand and Gravel Producers, was one of the leaders of the opposition at the hearing before the Interstate Commerce Commission, July 8, 9 and 10.

Mr. Johnston served notice that producers are in this fight to carry it to a finish. He said:

We have come to you, gentlemen, as the court of first resort, in our fight for relief. We have endeavored to come in a spirit of fairness and moderation; but make no mistake, we are fighting for our lives, we are desperate, and if relief be here denied us or its accomplishment uncertain or impossible, in our effort to preserve the industry which your order, inadvertently and as we believe, unintentionally, has all but destroyed, our necessity will force us to continue, regardless of consequences, until every remedy has been sought and our resources completely exhausted.

He further spoke in part as follows:

Representing, as we do, products that are basic and essential in the construction industries, and for which there is no substitute and which can only be transported in open-top equipment, we were the first to feel the effect of Service Order No. 7; the first to appreciate its ultimate result on our national construction program, and I believe also the first to give any constructive consideration to ways and means of preventing a more serious condition.

Neither are we here to deny, despite whatever curtailment of industry may be necessary, the wisdom of the Commission in seeking to secure for all sections of the country an adequate supply of coal. Hard roads may facilitate the flow of food products from the farms and tend to keep down the price thereof, but without fuel to cook them, they are valueless.

If the same motive which inspired the Order had prevailed among the coal operators of the country and the forces of our transportation systems, the result could so easily have been all that it was planned to be, and ought to have been. On the contrary, what do we see? What are the results for which our industry and others allied with it, have been obliged to make so heavy a sacrifice? I hesitate to call your attention to them, for I know that in some measure at least you must be advised of existing conditions and sorely disappointed when you contemplate them.

With the delivery of coal, rather than the mere loading of it into cars, the most essential service the railroads could perform, we see, after three weeks in which coal has had absolute right of way, no commensurate increase of stocks in the Northeast or the Northwest. This the coal interests themselves admit; yet they continue, for what reason, no disinterested observer can see, to clamor for still more cars. We see a scarcity of coal in even regions adjacent to mining centers. We expected to see, and endeavored to console ourselves for our own losses by the vision, one long train-load after another, day and night, on the way to its destination.

On the contrary, we see a large proportion of open-top equipment, loaded with coal but not transporting it; we see many plants closed down and their labor idle, while the cars that might have kept them going are used for storage for coal. We see every terminal, junction-point and yard full of coal, some of them of such age as literally to have grown gray. We are not assuming to fix the responsibility for this but are stating the fact merely as evidence of the most convincing value in support of the claim that Service Order No. 7, which seemed well calculated to remedy a most serious situation, in its practical effect has proven a failure.

To summarize: Service Order No. 7 has produced three results; two of them—the failure to greatly increase the delivery of coal where needed and the outrageous increases in price thereon — wholly unexpected. The other result, the slowing up of industry, was expected, but I submit, not in the degree actually suffered. I have made for your advisement an exhibit based on reports from all sections of the country. From this it is apparent that our industry for the first ten days

of application of Service Order No. 7, was operating only about 22 per cent of capacity. We, and those allied industries dependent on us, are losing daily about what the coal barons are stealing.

Many of our plants are down entirely. The teams or trucks that normally would have been hauling the materials from them to the work where it was to be used are idle. Bricklayers, plasterers, concrete-workers and laborers are marking time. Houses, elevators, warehouses, silos and hard roads are at a standstill. Drainage and conservation projects, sewage disposal plants and hard roads cannot continue. Locomotives are beginning to slip for want of engine sand, and the railroads of the country are actually losing in revenue over $300,000 per day. This is the price industry is paying unnecessarily, as we believe, and without adequate benefit to any one.

With us a fairly adequate and regular car supply is an essential of economic operation. Our costs are substantially fixed, regardless of output. Our plants have to be manned and maintained so as to load promptly all cars received up to our full capacity. Our labor must be given steady employment during our short season if we are to keep them at all. It costs nearly as much to steam up for a partial day's run as a full one. We cannot store material without heavy additional investment and a sizable increase in operating costs.

Unlike coal, we are not allowed to use cars for storage but must load and unload them promptly, or pay the penalties of demurrage—a discrimination we expect at no distant date to ask removed. For these reasons it usually causes us more of a loss to operate part time than it would to close down completely, so that if we are to run at all we must run fairly regularly and approximately to capacity. Furthermore, our products sell for an average of about 75c per ton, F.O.B. cars (when we have any) at our plants. Needless to say, our margin of profit is small and an efficient and continuous operation a stern necessity with us. Under these conditions, it is readily apparent why we cannot long continue to do our part in keeping industry moving, with only 22 per cent supply of cars.

Each railroad has assumed to interpret your order in view of its own desires or conditions, and the general principle adopted seems to be "Deprive sand and gravel of all cars possible, no matter what else is done." Order No. 33 was so construed. Some are now refusing cars to us even in the direction of the mines. Others so route them as to come within the letter but not the spirit of the order. Others permit equipment to stand idle when not needed at mines rather than load with our products, which move on a comparatively short haul,—less than 60 miles—and usually in local trains. At this time these locals are running light and are not much affected by the congestion at terminals, and should be handling capacity tonnage.

As we see it, the trouble seems to be, not so much with the order itself as the arbitrary and indifferent manner in which it is being executed and the spirit of it ignored, and it is of that phase of the problem that we ask your careful consideration. Without urging at this time, in view of existing conditions, our contention that every shipper is entitled to a fair share of all available equipment, we do maintain that a uniform, consistent and wholehearted effort on the part of transportation officials and employes will, within the spirit if not the letter of the order, give coal all the cars that can be moved promptly and still take reasonable care of the construction industries. As to the ways and means of securing such an effort, we do not presume to advise, but we do ask you, as a matter of law and simple justice to promptly adopt such measures as will secure a proper interpretation and an efficient execution of your order. We ask you to remember that our products can move in no other than open-top equipment; that the denial of a fair share of this for the past few weeks has all but spelled ruin to many of us, and that now, having made a vain sacrifice for the people of the Northeast and the Nortwest, we claim our right to eat as of equal urgency with theirs to be warm.

Fred Spies of Graettinger, L. C. Bingham of Estherville, Floyd Goodrich of Humboldt and J. I. Merriman and William Dewey of Milford, have organized a big gravel company at Milford, Iowa, with a capitalization of $200,000. The firm will go after the development of the sand and gravel in the southern part of Dickinson county.

Ours Are Basic Commodities

Ben Stone Tells Commission They Should Be So Recognized

BEN STONE, of the Illinois Sand and Gravel Producers' Association, asked at the I. C. C. hearing that sand, gravel and crushed stone be recognized as basic commodities in the light of their importance to the life and comforts of the whole people and that transportation be allotted to those commodities in proportion thereto. He said the lack of open top car service had cost the industry many millions of dollars. He said:

We submit that it is in the interest of the public and the commerce of the people in the present emergency that transportation be provided for these commodities in a quantity commensurate with the public welfare.

It so happens that the larger coal carrying roads in Illinois and surrounding districts are also the principal carriers of sand, gravel and crushed stone. This is because those roads have in the past aggressively sought and encouraged the location and development on their lines of this class of traffic in order that they might have loading for open cars at a time of year when there would ordinarily be a surplus of such equipment.

The switchmen's strikes at Chicago, Peoria, East St. Louis, Springfield, Bloomington and other points came at the opening of the operative season and the service during April was very erratic. Reports to our office from twenty plants from inner and outer zones around Chicago showed car supply in May 22.7 per cent, and in June 12 per cent, based on capacity to load and ship.

In May there was shipped into the Chicago switching district by those twenty plants only 2,110 cars, about 100 cars per plant for the month, or four cars per plant per day. In June total cars to the Chicago district were only 735.

We do not have actual figures for the entire state, but information indicates the general situation about the same as around Chicago.

With the issuance of service order No. 7, we felt there would be some improvement in respect of movements in mine directions; but we have to advise that to date such has not been the case. The effect of the order has not been the same on all roads, nor do we presume that to have been the expectation.

All of our roads seem to understand the order permits loading in mine directions, only after its requirements as to coal loading have been complied with. Three of them have found it necessary to move all available cars empty to mines and connections in order to meet their obligations as they understand them. One is furnishing a limited number of cars for highway work only when in the direction of mines and refuses to handle any business into Chicago because it is a short distance out of line. Out of twelve plants on this particular road only four have highway contracts. Other roads are furnishing cars in limited numbers for mine directions only.

We believe the Commission is informed of results obtained from order No. 7 and can judge accurately of its accomplishments. We sincerely hope it will not be necessary to reissue it nor to have it succeeded by another order of similar nature.

It is difficult for us to understand how preference as to car supply for loading coal, or any other commodity, could under existing conditions be in the public interest.

We regard the present transportation situation as the most important economic problem before the country. We know we cannot change its fundamental features by prescriptions; but we can shape our transactions to conform to the principles by which it is controlled if we go about it with courage and understanding.

We know that the demand for transportation will continue for some time greatly in excess of supply. We can reasonably expect to save in due time an increase in the output of our present transportation plant up to a point approaching its human and mechanical capacity; but beyond that we cannot go until the plant itself can be extended.

We know that the life and happiness of the people depend upon adequate transportation of commodities essential to comfortable existence.

Therefore, it would seem that the limited amount of transportation we have must be distributed with due regard for the essential needs of the whole people under present conditions and we believe it to be within the powers of this Commission to accomplish such a distribution as to traffic requiring open top cars by establishing a schedule of priorities under which commodities using such cars will be listed in the order of their relationship to the essential needs of the people under present conditions.

That would mean, of course, curtailment of non-essentials; but we humbly submit that deflation of that sort is quite as necessary as in any other direction, and we believe this Commission would perform a lasting service to the people, not only in this country, but throughout the world, by helping to accomplish that end.

Order No. 7 as Amended

But the Changes Give Little Relief to Affected Industries

THE new Order No. 9 of the Interstate Commerce Commission, taking the place of Order No. 7, has the following amendments from the latter order:

(1) By adding to second paragraph: "*Provided*, the phrase 'coal cars' shall not include flat bottom gondola cars with sides less than 36 inches in height, inside measurement, or cars equipped with racks, or cars which on June 19, 1920, had been definitely retired from service for the transportation of coal and stenciled or tagged for other service."

(2) The words "for period of 30 days beginning June 21, 1920," amended "for 60 consecutive days beginning June 21, 1920."

(3) Fifth paragraph be amended to read: "Common carriers directed until further order of Commission to embargo against receipt of coal or other freight transported in open top cars suitable for coal loading, as hereinbefore defined, by any consignee and against placement of such cars for consignment to any consignee who shall fail to unload coal or freight so transported in coal cars and placed for unloading within 24 hours after such placement, until all coal or freight so placed has been unloaded, provided, this authorization shall not interfere with coal under permit to any coal pool when authorized by order heretofore or hereafter entered by Commission or coal consigned to tide-wate or lakes for transshipment by water, nor shall it apply where failure of consignee to unload is due directly to errors or disabilities of railroad."

(4) Following fifth paragraph of Order No. 7, insert as follows: "Until and including August 19, 1920, all carriers within said territory, to the extent that may be necessary in order that public utilities including street and interurban railways, electric power and lighting plants, gas plants; ice plants, water and sewer works, also hospitals, schools, and other public institutions, may be kept supplied with coal for current use but not for storage, be and they are hereby authorized to place, furnish and assign cars to coal mines for transportation of such coal, in addition to and without regard to existing ratings and distributive shares for mines upon said railroads; *provided* no cars shall be so placed, furnished or supplied by any such carrier without written application therefor from public utility concurred in by delivering railroad, showing that such coal is needed for current use, and not for storage; in order that applicant may continue operation, and *further*, such coal shall not be subject to reconsignment except to public utilities or public institutions, and that written report of the cars placed hereunder shall be promptly made to Commission by railroad."

A new Chicago stone producing company has been organized, to be known as the Inland Crushed Stone Company, composed of Messrs. A. J. Sullivan and H. L. Peaslee, formerly of the United States Crushed Stone Company. The plant purchased by them is a thoroughly modern stone crushing plant, located at Joliet, Ill., where they have very extensive rail connections; namely, Chicago & Alton, Elgin, Joliet & Eastern; Michigan Central; Chicago, Milwaukee & Gary; Chicago, Rock Island & Pacific; and the Santa Fe. Thus they are in position to make carload deliveries to Illinois, Indiana, Iowa and Michigan, and to points in the Chicago switching district.

Other Lines of Industry Represented

Lime, Molding Sand and Silica Sand Presented Strong Cases

HUBERT B. FULLER of Cleveland, secretary of the American Sand Association, was one of the witnesses at the hearing on Order No. 7, his testimony in part being as follows:

Gray iron molding sand and silica sand are essential raw materials to the iron and steel foundries. They are as essential as iron, coal, coke and limestone, and during the period of the war they enjoyed priority orders because they were considered essential to the manufacturing of steel castings and iron castings.

The members of our Association quarry silica sand, which you understand is a blasting process and a grinding process, while the gray iron sand is a stripping process. They shipped last year approximately 11,000 cars, an average of 50 tons per car to a total of about 550,000 tons of these sands last year, and last year was way below normal. Our normal production runs to about 30,000 cars of foundry sand per year. Most of these sands are located at quarries or in pits in very small villages or practically out in the country, and manifestly there are no coal cars going in there which can be loaded for return movement toward the mines.

It has been impossible since this Order No. 7 was issued for us to secure cars. If the iron and steel business is an essential business, then we are, of course, an essential industry. We have not been able to secure box-cars even, because it has been apparently impossible for the railroads to give us box-cars. We do not desire box-cars because it is so much more expensive to load them.

R. E. Riley, representing shippers of silica sand in northern Illinois, said the effect of the order had been to curtail the supply of cars which those shippers had been getting. He said they should have box-cars for their shipments, but that they had been using gondolas with unsatisfactory results because of the difficulty of keeping the sand dry.

"We are not entirely satisfied that there is a coal shortage," said he. "There seems to be no shortage of coal, provided an industry is willing to pay the price."

Riley made the following recommendations to the Commission as a solution of the problem:

That cars be apportioned among all industries pro rata according to their ability to load and ship.

That in determining this pro rata cars made empty at the plant be considered in the allotment.

That all reconsignment rules for the time being be suspended.

That the acceptance of cars to hold for order be discontinued.

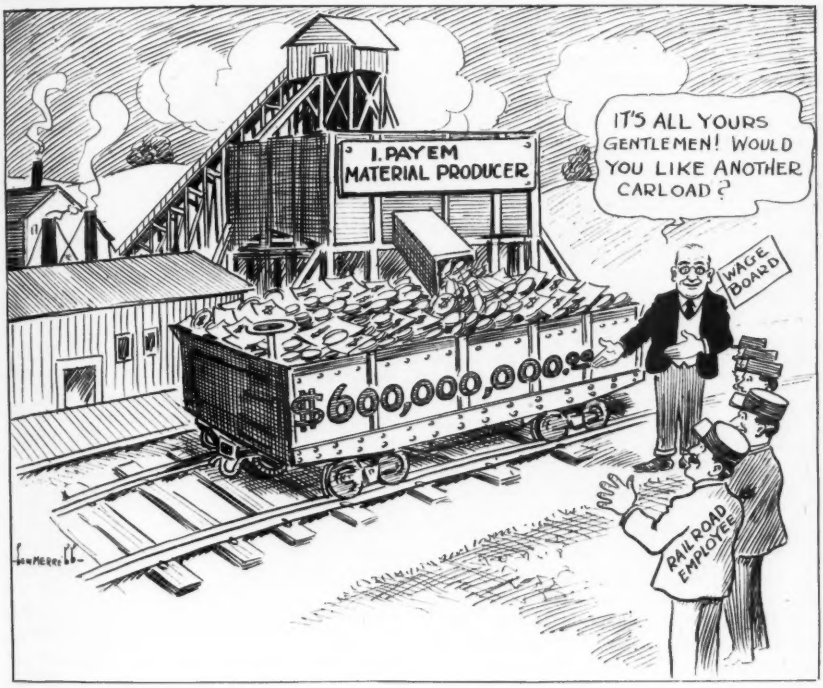
That shipping permits be required for all shipments, including coal, consigned to tidewater for export.

That for the time being a demurrage code be established to compel unloading of equipment

Riley also said there should be some form of control established so that shippers would get the entire number of cars apportioned to them by the carriers. He said the problem was one which must be largely worked out between the shippers and the railroads, and that this could be accomplished with little restraint from governmental agencies.

Henry M. Camp of the staff of the National Lime Association represented that branch of industry and spoke in part as follows:

While the lime industry recognizes the urgency of the coal situation and fully appreciates that Service Order No. 7 was designed to meet the fuel emergency, the industry is also directly affected in its operations by the shortage of coal, largely attributable to inadequate transportation facilities, and it is of the belief that the purpose for which Service Order No. 7 was designed has not been realized in so far as expediting the movement of fuel to lime plants, which are urgently in need of bituminous coal in lime production to be used in the construction of such residential buildings as homes, tenement houses, apartments,



Where does all this money come from?

and hotels, in the building of hospitals, schools, and charitable institutions, and various buildings to be devoted to manufacturing; as well as the production of lime necessary for the fertilization of the soil, and therefore, imperatively needed in the work of increasing the food supply. Lime is also used as a basic and component material in the manufacture of steel paper, and many other essential commodities in the industrial and chemical fields.

We, therefore, hope that such changes in the provisions of Service Order No. 7 can be made, whereby the distribution of open top equipment will not be confined by priority in a manner except as may be found necessary with reference to the coal supply of sections to which coal can move freely only at certain seasons of the year, and so that the building and construction industries, so essential to the country's needs, may receive reasonable consideration with regard to distribution of open top equipment.

From Cement Viewpoint

Johnson Speaks for These Manufacturers on Injustice of Order

A. N. JOHNSON of the Portland Cement Association told the Interstate Commerce Commission that two things were needed:

1. Immediate relief to the construction industry through change or abrogation of Service Order No. 7;

2. The establishment of a fixed policy that will prevent in the future, except in time of war or other extreme emergency, any resort to preferential treatment of shippers or the establishment of priorities.

Mr. Johnson's statement before the Commission included the following:

With the quantities of coal already

produced this year several million tons in excess of that produced during a similar period last year, as we are informed, there would seem to be no insurmountable difficulty to build up stocks of coal in those sections of the country reported to be in distress without general derangement of the traffic facilities of the eastern half of the country.

It hardly appears fair or logical to give priority for the transportation of all coal for all uses and to all parts of the country, when an emergency shortage exists in but a few well defined sections of the country, and for certain specific situation.

The cement industry has a two-fold interest as regards the effect of Order No. 7. Whatever tends to curtail the construction industry has direct influence on the cement business. Also, many cement mills are dependent on open top cars for raw materials.

Since November 1918, the construction industry, second only to agriculture, has been continuously handicapped. Governmental restrictions, increased cost, labor shortage, production shortage, lack of transportation facilities, have all combined to prevent construction enterprises. The construction industry is basic. Whatever tends to curtail this industry is certain or far-reaching effect and if carried much further must result in great industrial depression.

At the present time there are actually available for highway construction over seven hundred million dollars, money that cannot be used for other purposes. These roads, if constructed, will be of great help in lessening railroad terminal congestion.

It is recognized that terminal congestion plays a far larger part in the present difficulties of the railroads than the moving of the business over the roads out on the lines.

Much of the terminal congestion results from the short-haul shipment of necessary food products for the daily subsistence of the people living in our large cities. Therefore not the least among the structures for which need is most pressing are improved roads, in order that motor trucks operating over such roads may in taking over a greater share of short-haul traffic contribute in still greater degree to the relief of terminal congestion. Not only should new roads be built but those now in use must be maintained.

It is a fact there are today millions of dollars' worth of money invested in road structures going to ruin simply for lack of material repairs.

The country over, contractors and contracting organizations find there entire business capital jeopardized and ruin staring them in the face, due to their inability to secure necessary materials, such as sand, gravel, lime, cement and other basic construction materials.

It should be borne in mind that the results are more than the immediate suspension of construction projects, disastrous as they are. Contractors with equipment lying idle and deteriorating, organizations scattered, and expenses continuing, will of necessity have to recoup and it will be the cause of a continued increase in prices. For every hazard which a contractor must shoulder the public must pay an increased price. This is the insurance the contractors will demand. Therefore, there is seen the importance not only of some immediate relief but of the establishment of a policy that will remove as far as possible such transportation hazards as have been experienced this season.

In this general disturbance to construction activity the cement industry is seriously interested. It is also directly concerned with the movement of raw materials in open top cars. Many mills are today curtailing production because of non-receipt of raw materials, and in a few instances mills are compelled to close and remain idle, their workman without pay.

We, therefore, take this opportunity respectfully to point out to the Commission:

1. That the arbitrary derangement of traffic facilities first, under order of the Commission on Car Service of the American Railway Association through Circular CCS-33, and later under order of the Interstate Commerce Commission known as Service Order No. 7, has not accomplished what we believe was the intent of the Commission, namely to have coal distributed where needed and to keep down prices; but has caused a most serious condition to be faced by the interested in the construction industry.

2. That the principle of giving to a single industry arbitrarily an undue proportion of the transportation facilities of the country is wrong and in practice is found to accentuate many-fold the difficulties which it was the intent to correct.

Keeping Trucks at Work

How One Chicago Concern Handles Over a Hundred of Them

THE Consumers Company, Chicago, doing an extensive business in building materials and other commodities, has over 100 motor trucks in constant operation. Some of the methods used in handling them to advantage were told by Mr. David D. Bush, assistant to the vice-president of the Consumers Company, in a recent issue of System. From his article we take a few paragraphs at random:

We keep an accurate record of the cost of operating our trucks, and of the performance of each truck. To make this information more valuable to us, we chart it on graph paper. Among other things, our graphs show us the cost of delivering a ton of coal, ice, or building material for each type of truck that we operate; the cost of maintenance of each truck; and the average cost of maintenance of each type and make of truck that we operate.

We charge the yards for hauling at the regular union rate. The dfference is credited as so much profit earned by the transportation department.

The revenue of the individual trucks —of the larger capacities—figured at the union rate, varies from $25 to $150 a day. Three times in the last year or so we have raised the quota for our trucks, and each time they have passed the quota with surprising promptness. In the last three months we have raised the average earnings of each truck in our fleet by the neat sum of $1 an hour. With some 100 trucks on the road every day, it takes no mathematician to figure out the difference that that means in a month of 10-hour days.

One of the basic rules which we try to keep in mind at all times is that each type of truck must be kept as much of the time as possible on the work to which it is best fitted. For example, we use practically nothing but our 7½-ton trucks, equipped with hoists and dump bodies, for hauling coal in the business district. In this district we are able to load 10 tons on them without feeling that it is an overload, and the manufacturer of the trucks agrees that this is permissible in view of the good roads and the good condition in which we keep our trucks. These trucks have, most of them, been in service for three years; they show practically no wear. That alone bears out our belief that we are not "overloading."

We bend our best energies to keeping our trucks on the road all the time; when a truck is traveling it is doing the work for which it was designed. When it is standing still it is, as used to be said of horses, "eating its head off" in depreciation, interest, wages and other expenses.

One of the most effectve plans by which we avoid this undesirable condition of idleness is by our schedule or despatch board which hangs in the transportation department at the main office. This schedule board bears the numbers of our various yards; and it operates by means of significantly corored tacks which indicate where each piece of hauling equipment is to be found during the day—horse-drawn vehicles as well as motor.

A large map of our territory hangs nearby, to show the despatcher the location of each of our yards and garages. By telephone he gets reports on the need for equipment, and conversely the yards where an idle period impends.

The various yards, depots and plants call the despatcher's office in the afternoon and tell their needs for the next day, as nearly as they can forecast them. He makes up his schedule for the next day's work then, and telephones to the garages the assignments for the various trucks which report to them.

In the morning the superintendent of garages reports where all the equipment has been sent; this is carefully depicted on the board by appropriately colored tacks. When, during the day, yard 42 calls up to say that unexpected orders make two more trucks necessary there during the afternoon, the despatcher has only to consult his board. He finds that yard 107 is going to have two trucks idle after 2 p. m. So he calls the manager of yard 107 and tells hm to send the two trucks over to 42, which is only three miles away. This sort of transfer takes place many times a day.

We use on our trucks the best equipment that we can find to facilitate loading and unloading. Hoists and self-dumping bodies are expensive from the viewpoint of upkeep; one costs us about as much to maintain as do all the rest of the trucks. But it more than makes this up by the time it saves in unloading at the customer's.

We are careful to know everything that we can about the way a truck is performing. Every day the various yard superintendents report on every piece of transportation equipment which was in their service during any part of the day. The report shows the number of loads hauled, tonnage delivered, number of miles covered, loading time, time the truck was taken out and running time of each truck. The despatching department inspects these reports carefully as they come in; the despatchers devote their entire energies to increasing the daily revenue earned by each truck. One of their aims is to keep each truck running out of the same yard all day, unless a load takes it near another yard. For only in this way can the unproductive time on the road be held down to the minimum.

The clerk at each yard keeps a record of each truck working out of his yard; the time entries on these sheets must show a good performance, or else an explanation must be penciled in the margin. When too many intervals appear, the yard superintendent is reminded that it is desirable to keep the trucks on the move. But the superintendent already understands this so well that we have little occasion to jack them up.

This form accomplishes for us what a good many concerns employ a man to do—check up on the trucks when they are out of the yards. We have no men out followng trucks; we do not need to know more about the trucks' movements than the form discloses. And the feeling among the drivers is naturally a good deal better than it would be if they felt we employed "spotters." By keeping after the yard superintendents we accomplish better results than we could by the other method.

We have few emergency repairs to make. And our trucks lose very little time because they are not in running order. We consider ourselves unusually unfortunate if as many as two machines are laid up for repairs, excepting, of course, at the time when we are overhauling. And yet we own over 100 trucks.

We try to catch our repairs before they reach the emergency stage. Our drivers have orders not to drive as much as a block if their trucks show symptoms of serious trouble. And every one of our drivers is enough of an automobile mechanic to know when something is wrong.

When anything goes wrong with his truck, the driver calls the main garage at once. He tells what is the matter; and within five minutes a repair man is on the way to the stalled truck, in a service car in which he has packed the tools or parts necessary for the repair—we keep on hand stock of all parts. As a result of this policy, the truck is usually not laid up for even an hour; and we get many an extra mile out of our trucks, as a direct result of keeping several service automobiles on the job. No Consumers truck ever "limps in" to the garage.

Another step in our campaign to prevent emergency repairs is our method of having the foreman at each garage question the truck drivers as they come in at night, one by one. He asks them about the various parts of the car, and how they are working. The driver may not remember offhand the slight engine knock which he first noticed about 4:30; but he recalls it under the foreman's skillful questioning. And the foreman makes a note of each needed repair.

These repairs are made at night; it is seldom necessary to lay up a truck when the damage is caught before it has become serious.

We now have our garage decentralized to 4 points most accessible to our yards. The main garage takes care of all major repairs; and we maintain an average of 3 men for every 12 cars that we store at the other stations. The mechanics go over every car every night, tightening brake-bands, straightening mud-guards, checking up on all the little things which may go wrong with a truck, and catching these flaws before they develop into serious troubles.

Besides the mechanics, we have an inspector who makes the rounds of our garages at night, looking over the trucks and seeing to it that none of the maintenance work is slighted. He inspects the wheel bearings, for instance, on every truck.

Because we have so many trucks we are able to economize, and at the same time be more sure of the quality of the work, by doing our own painting. And we make in a central shop even the heavy welding repairs that our smaller machine shops are not equipped to make.

We have been extensive users of motor trucks now for a number of years. And as nearly as we can tell up to this time, looking after the important points of maintenance and operation makes the truck's life practically unlimited. Some of our trucks have run 170,000 miles and are, as nearly as we can tell, just as good as they were the day we bought them from the manufacturer.

Taking Stone from the Top of a Mountain

By DANIEL J. HAUER

A PICTURESQUE crushed stone quarry is that located in the Chestnut Ridge range of the Allegheny Mountains, in the southwestern part of Pennsylvania, six miles from Connellsville, Fayette County, at Casparis Station, and operated by the Casparis Stone Company, of Columbus, Ohio.

High up on the top of a mountain, about 700 feet above the Baltimore & Ohio railroad, is the quarry development, the opening being operated as a grade quarry. Extremely unusual, and attractive by reason of the boldness of the operators in undertaking a proposition that in many ways would deter others from investing their money, this stone company has solved a unique quarry problem, and the entire operation is of great interest.

The stone being quarried is a fossiliferous blue stone of an excellent quality for crushing. Locally it is known as Ligonier blue stone, taking its name from the town in Pennsylvania where it was first quarried. This stone is known to geologists as Greenbrier bluestone, as it was in Greenbrier County, West Virginia, that the stone was first charted and located in our geological surveys. This stone occurs throughout the Allegheny Mountains between the two points mentioned. In southwestern Pennsylvania the stone runs in ledges approximately 80 to 100 feet in depth, overlaying sandstone strata, the Mauch Chunk shales, and certain coal seams. This fact means that the elevation of this ledge above tide-water is from 1,400 to 2,000 feet, so that with the elevation of the railroads and the rivers varying from 1,000 to 1,200 feet, the blue stone is in most cases several hundred feet or more above the railroad and river. As previously stated, the ledge as Casparis is about 700 feet above the Youghiogheny River and has an overburden of earth. The quarry tract has about 300 acres of land in it.

The first work to be done in developing and opening the quarry was to lay a tram track, at an incline of approximately 45 degrees, from the railroad to the quarry floor. This track is about 1,400 feet long. At the top of the incline is a large Flory hoisting engine operated by a 150-horsepower General Electric motor. Over this tram track, on a heavily constructed car, all of the machinery and supplies have had to be hauled up. This has been quite an undertaking, as heavy pieces of machinery weighing as much as 20 tons, such as the side castings of the Blake crusher, have been pulled up the mountain side.

To accomplish this and make it safe, an auxiliary hoisting engine operated from the compressor was also used for these heavy pieces. The electric hoist, operating faster than the compressed air, made it necessary for the electric machine to hold the load, while the compressed air hoist caught up the slack on its cable.

The ledge in this quarry is drilled in the most approved manner. An electric driven Clipper well driller is used on top of the ledge, sinking deep holes. For deep holes in the face of the ledge for breasting up, and for driving snake holes in the foot of the ledge, Ingersoll-Rand tripod drills are used. For shallow holes and breaking up boulders a jack hammer drill is used.

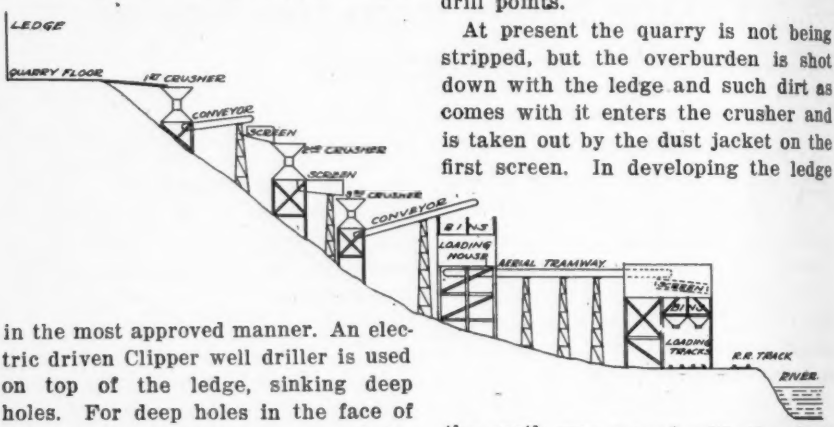
In too many quarries the proper drilling equipment is not used. If well drillers are employed the tripod drills are discarded, or if the latter are used then well drillers may not be, while in some large quarries the writer has found only hammer drills.

The combination of the three types gives the most economical results, as the well drillers should always be used for deep holes, those more than 20 feet deep, especially for breasting up the ledge, while the hammer drills are ideal for holes up to 12 feet and for breaking boulders.

After the rock is shot down, a Marion steam shovel, Model 100, is used to pick up the stone and load it into Kilbourne & Jacobs 6-yard two-way dump cars. These cars are operated in two trains by electric locomotives.

For operating the drills there is located to one side of the crusher plant an Ingersoll-Rand compressor operated by an Allis-Chalmers motor. Near the compressor plant is a well equipped repair and blacksmith shop. A Leyner drill sharpener is used to sharpen the drill points.

At present the quarry is not being stripped, but the overburden is shot down with the ledge and such dirt as comes with it enters the crusher and is taken out by the dust jacket on the first screen. In developing the ledge the earth was moved with the steam shovel and piled in front of the quarry, making a barrier to prevent the blasted rock from being thrown down the mountain side.



But the overburden is becoming much heavier, and a large Bucyrus drag-line excavator with a 3½-yard scraper is being installed to handle this mass of earth and rock.

The crusher plant is located on the mountain side just below and adjacent to the quarry floor. This entire plant was designed by the Allis-Chalmers Manufacturing Company, of Milwaukee, Wis.

The sketch shows the general layout of the plant. The cars loaded with stone come alongside of the crusher plant and dump sideways directly into the primary crusher, an Allis-Chalmers jaw crusher of the Blake type, with a capacity of from 3,000 to 4,000 tons of stone per 10 hours. A 150-horsepower motor furnished by the same company

operates this large crusher. The opening of the crusher is 48x60 inches, thus taking stones of more than 1½ cubic yards in size. The stone from the primary crusher is dumped on a belt conveyor which discharges into the first screens. First the dirt and dust go out through the dust jacket into a boot, from which it is carried by a small belt conveyor to a waste pile on the mountain side. Each of these conveyors is operated by a 10-horsepower motor. The screens have a 20-horsepower motor. The fine stone screened out is carried by a concrete chute to the third crusher.

All the stone passing out at the end of the screens is dumped into the secondary crusher, a No. 8K Gates gyratory. This crusher, operated by an Allis-Chalmers 100-horsepower motor, has a capacity when fed with material of the size as received from the primary crusher of from 2,000 to 3,000 tons per 10-hour day.

The product of this crusher goes directly into screens, taking out smallest sizes and carrying the tailings to the third crusher. The stone passing the screen is carried by a chute directly to the belt conveyor located below the third crusher, which is a No. 6K Gates gyratory crusher, operated by 40-horsepower motor and having a capacity when fed with stone the size received from the secondary crusher of from 600 to 1,000 tons per day. The screens feeding this crusher are operated by a 20-horsepower motor. This crusher discharges its stone onto a belt conveyor operated by a 10-horsepower motor, into bins as indicated in the sketch. All of the belt conveyors are furnished by the Link-Belt Company.

One commendable feature of this plant is that it is housed throughout with a frame of heavy timbers on concrete foundations, the sides and top being corrugated iron. Another is that over each crusher there is a heavy frame hoisting trolley track equipped with chain triplex blocks for making repairs to these crushers. Thus all the heavy parts can be easily handled and replaced, and bearings can be adjusted and babbitted.

From the bins the stone is taken out by dump buckets which are carried on an aerial tramway to the screening and grading plant located over the bins at the railroad loading switch. This tramway is operated by a 65-horsepower motor. This tramway was built by A. Leschen & Sons and has a capacity rated at 1,500 to 1,800 tons per 10 hours. The buckets are loaded from the bins on the side of the mountain and discharged into screens over the bins at the railroad siding. The actual grading of the stone is done by the screens over these bins, a 20-horsepower motor operating them.

The water for the quarry is pumped into a tank located on the quarry floor, from the river, by an electrical pump, a 10-horsepower motor being used. A stiff-leg derrick, operated by a steam hoisting engine, is located near the railroad track to unload heavy machinery from cars onto the car on the tram track.

This quarry is but newly developed, the situation of it meaning slow work in installing the machines, while the war no doubt held up the work, so that although the operation is running smoothly, yet further money must be and is being spent. The quarry is planned for a large output, as is shown by the crusher installation, but the present output is governed by the capacity of the aerial tramway. To increase the output of this quarry would mean to either increase the capacity of this tramway or add a similar unit, preferably the latter, if the full capacity of the crusher plant is to be utilized.

Institutional Management for Business

HOW am I to secure enough labor to operate my plant, hold them at work and make them efficient;" is a question many employers are asking and among the number are quarry and pit operators.

The answer is not an easy one; and while a book could be writen on the subject yet a few suggestions can be given in some articles.

Today the employer who is indifferent to his employes and stands aloof from them, is not only going to be short of help, but he cannot hope to hold men or get fairly efficient work from his employes. A large employer of labor a few years ago said to the writer, "I do not know the name of a man in my employ under the grade of superintendent, nor do I want to know them by name or by sight."

Contrast this with the case of a man who employed men all his life, and who called every man in his employ by his first name. This man had many employes who had been with him for years, many over five years, a number ten, many fifteen years, some more than twenty years, and a few had exceeded twenty-five years. One man, the first one he ever employed, stayed with him until he died.

An employer does not have to be familiar and hail-fellow-well-met with his employees, but he should know them, and encourage them to know him. It breeds respect, it breeds confidence, it breeds loyalty. Without this personal contact the workman only has his wages to hold him to his job; and with work being plentiful and wages high the workmen go any place and get employment with top wages, hence some inducement other than wages must be held out.

No one thing other than wages will hold a man in another's employ, but the first thing to begin any acquaintanceship is personal touch. A man running for office, but little known to the public, who can get out among the voters and shake them by the hand and talk to them, is assured of election. So it is with an employer; let him have this touch and it means money in his pockets.

"Good morning, Mike! And how are your horses this morning?" if given by an employer to his teamster means not only to gain the respect and esteem of the workman, but by asking about the horses and using the word "your" means to throw responsibility upon Mike, to infer that the employer has confidence and partnership in the driver and also interest in the work he is doing. A greeting like this will help to carry a man through his day's work in a more efficient manner.

"Hello, John, how's the wife? I hope she continues to improve," is a help to the laborer, who has a sickly wife at home.

"Here, George!" to a water boy, "I see that many of the men are leaving small tools lying around, so I guess I'll have to depend upon you to pick these up in your spare time and keep them in a pile."

Such remarks as these will bind men together, not only for the day's work, but for periods lasting over years.

A man's business can be made an institution around which the requisite number of men can gather, bound to it by sentiment and business. It can be made a mutual and co-operative affair, even if there is not a division of profits from a co-operative standpoint; an institution that gives the set of men so bound together their living. The employer furnishes the capital, and he through his managers, furnishes the supervision and direction while the mechanics and laborers furnish the labor that allows the institution to earn such money that, when distributed upon pay day, gives each man and

his family a living. The family is as vitally interested in the institution as is the workman. If the family is ignored, as is generally the case, there is a rupture in the institution, or it is not complete.

Institutional management differs essentially from the business management of the past. Not that there has not been institutional management in the past, for there has been; but its value was only realized by the few, so that business was run as a cold-blooded affair of getting all profits possible, or all wages that could be obtained, and the devil take the hindmost. No one cared for the past or the future. Sufficient unto the day was the evil thereof. It was to combat these conditions that labor unions grew and multiplied. It was to overcome the bad effects of the business principles of the past and to combat the labor unions that organizations of employers came into existence, with the result that we have manufacturers' associations, merchants' clubs, contractors' societies, quarrymen's organizations, and sand and gravel producers' associations.

These organizations on both sides have led up to and have shown the value of institutions and the sentiment and business benefits that come from men being bound together by a tie that not only means more money, but closer relationship and better general conditions surrounding a business or profession. Now then, if an institution can be built up by a number of people around a certain business, and institutional management applied to the general features, it should be evident that the same things can be applied to an individual business, that in many organizations a few or a large number of men can be molded into an institution, with all the benefits that occur from such management.

The fact is that during the past decade institutional management has been inaugurated in many lines of business and with great success. The conditions brought on by the war have caused the change of some ideas and given all thinking men some new points; but institutional managment in business organizations has been strengthened by the experience and broadened by the changes.

It is not a theory that is being presented, but an actual practice. However, it must not be made revolutionary. A man who expects to change things over suddenly from his present practice and attempt to make an institution, with all that it implies, instanter, not only will fail in his purpose, but may also wreck his business.

The idea must be thought out well for each business organization. It must take into account every detail and local condition. There must be a foundation laid upon which the structure must be built, and the men, both those in charge and those working under instructions, must be educated up to the idea and to the benefits to be derived. It is a fact that benefactors and philanthropists have been rejected by their own beneficiaries.

The beginning of this education is in that personal touch written of in this article. The men of the organization must get to know one another and there must be instilled confidence of one employee with another and of all with their employer.

With this as a basis, other educational work will follow that will be lasting and lead to the results that are desired.

The Easton Car & Construction Company, of Easton, Pa., have opened an office in Chicago, Ill., being located at Room 554, Railway Exchange Building. Mr. Chas. Tyler, district sales manager, is in charge of the Chicago office.

Crawford Sand & Gravel Company, Meadville, Pa., is a new $40,000 company. Its incorporators are C. C. Johnson, George C. Reitze, H. C. Kramer, and P. H. Mueller, Meadville.

Pit and Quarry

Published Monthly by

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Chemistry Saved a Loss in a Quarry

YES," said a quarry operator after reading a short editorial in PIT AND QUARRY, on the use of chemistry in pit and quarry operations, "chemistry is a great aid in this business. I remember when I opened up a quarry some years ago, much to my own and my brother's disappointment, the stone we were getting out for ballast began to 'peter out' and we found we had developed a ledge of white flinty stone.

"This was not acceptable for ballast and I thought we had made our investment for nothing. Not so my brother. He got samples of the white quartz, spent some weeks with several chemists, then several more weeks with prospective purchasers, with the result that after installing a grinder near our crushers, we crushed and ground quartz, which we found to be a more profitable business than producing ballast, although a few years later I opened up a ballast quarry a few miles from the other one.

"But for my brother and his chemists, we would have missed realizing the handsome profit we made on our quartz."

Look Ahead!

AN inquiring reader of PIT AND QUARRY walked in on us day recently. He was from a Missouri town; and, true to type, he wanted to be "shown"

What he was after was to get us to tell him where he could get a certain type of machine for his sand and gravel plant. He had been in correspondence with various manufacturers, but they were not willing to undertake to deliver inside of six months—and that is a long wait when a plant is lying idle and losing perfectly good orders in the meantime.

So he came to Chicago to explore the second-hand market—which did not offer him as much encouragement as usual, either.

The result was that he did not get just what he wanted, but had to be content with what he could get.

His difficulty might have been considerably less if he had anticipated his wants, instead of waiting until he was ready for the machine before thinking of placing an order.

All processes are slower than they used to be. This is a fact which we have definitely with us, and which bids fair to continue, so it might as well be reckoned with.

There was a time, for instance, when the editor could stop in at the print shop on his way home of an afternoon, to put his final "O.K." on the page proofs of PIT AND QUARRY, and get a copy of the complete issue, printed and bound, shortly after he got to his desk the next morning. But that is only a memory of the times "befoh de wah."

There is nothing like it any more. Now the printers drive down to the shop in their automobiles, hurry home as early as possible, and PIT AND QUARRY has to take its chances. Even after it gets to the post-office its troubles are not ended. Every reader may be reasonably sure that his copy

has been from two to six days longer getting to him than was actually necessary—and for most of that time it has been reposing in some dark corner of the Chicago post-office, waiting for some one to come along with the time to get it started on its way.

So for our part we are trying to move forward our closing date, so that the printers and mail handlers can take their own sweet time—as they will do anyhow—and still get the journal into your hands somewhere near the first of the month.

And you will have to do the same in your business. You will have to look farther ahead, knowing that the delivery of your goods will not be as it formerly was.

Manufacturers are having their labor troubles, just as are the employing printers and the Government postmasters. You cannot expect as rapid results from them as formerly. Give them time. Get your orders in ahead of your needs, just as you are urging your customers to anticipate their demands in the way of materials.

In reduced rate order No. 759, issued July 21, the Interstate Commerce Commission authorized the New Haven and other roads in New England to reduce the minimum weights on sand, gravel, and other materials of that kind. The application for that authority was made by the New Haven. Its application was based on the fact that, owing to the shortage of open top equipment, shippers of crushed stone were compelled to use cars with low side-boards in which it was impossible to load even approximately 90 per cent of the marked capacity of the cars. Some cars constructed especially for the transportation of pig iron have sides only 18 inches high and, while they can easily load 50 tons of pig iron in 100,000-pound capacity cars, not more than about 60,000 pounds of crushed stone can be loaded into these cars. The application asked for authority to charge actual weight on cars loaded to cubical or visible capacity.

Men of Many Minds

THERE came to this editorial desk a few months ago a number of letters on the subject of bonus systems and other means for stimulating the effort and holding the interest of employes. These letters were put in a file and dropped out of sight for a while, but have just come to light again, and they have so much of suggestion in them that a number of extracts will be of interest.

Here is the statement of a Michigan producer:

We have never adopted any bonus system, as the character and operating conditions of our plant are not such as to make it practicable to determine any basis for this method. We have, at various times, made small donations to employes in recognition of some particularly good day's operation, or something along that line. This was done without any previous knowledge of the employes and was not expected by them until they received the check. Whether this resulted in any better service, I am unable to say. However, it seems to be about the only method that we could employ.

Another well-known gravel man in Michigan has this to say:

We have never tried any bonus system with the exception that we give our superintendent one-half cent per ton on the production, over and above his regular salary. We employ farmers, who live in the neighborhood of our plant, who would rather work for us and be known by name than to go to the large industrial plants and be known by number.

Then there are three letters from Ohio, none of them speaking very encouragingly of any plan of this kind. One of them says:

Speaking from a personal viewpoint, the writer ventures to say that he believes that in the long run this profit sharing and bonus giving to employes will be a detriment to those that employ labor. Of course, for the immediate present, and in order to speed up production, it may do as a make-shift arrangement; but if it is necessary to give labor something besides wages to make it take an interest in their work, the disease lies too deep for such a

remedy to do too much good. Carry bonus-giving and profit-sharing to their natural sequence, and what is going to be the result?

Any system, to be productive of the desired results, must be so well understood by all that it can have no possibilities for argument and dissatisfaction. Here is what a Cincinnati man writes:

We have tried several methods of bonus systems, but cannot say that any of them were very much of a success. We at one time set a given tonnage for a day's work, and placed in reserve certain amounts per ton for all material produced beyond this day's limit, which money was divided at the end of the year, in practically equal proportions, between the various employes. We are sorry to say that in the division of this money there was more friction and dissatisfaction in general than there was satisfaction in receiving the money. Since that time, the only thing we have done is to make the bonus apply to the superintendent in charge only, and this has proven very satisfactory.

And then from Columbus comes this very interesting bit of side light:

On account of the fear of our men that we had something up our sleeve, we have never done anything in this line, but we expect to put over the Leitch system this year, if possible. We have hot soup for the men at our gravel plant at noon and hot coffee all day long, just as free as the drinking water; and one-third of the men will not accept it. Despite tact and everything else, they think we have an ulterior motive.

I do not think we would quit doing this—we think we see absolute advantage over the cost of it, and in a new plant under construction I will make special arrangements to feed the men and office force. The subject has for years interested me, but unions have done everything possible to keep working men from entering the field of greater profit to the employer.

From a producer in an important Nebraska center comes this progress report:

We have never tried out any bonus system or method of payment to employes other than straight wages, until this year. We are now putting our foreman and one of his main men on a basis of 5 per cent of the net gain over and above the previous year. I can tell you better at the end of the year how this works out.

And finally one of the big Chicago companies states:

We put into effect in April, 1918, a system of additional compensation to employes whereby we pay, at the end of each quarter, an additional amount of 10 per cent of the wages earned by all those who have been continuously employed during all of the preceding quarter. The plan is still in effect, but we find it difficult to decide whether the results have been successful or not.

One object was to encourage continuous employment, as we have always had a fairly large percentage of floating labor. On looking over the record it would appear that the men who have remained regularly in our employ since the beginning of the system, are in all probability the same who would have remained had there been no extra compensation. It may be noted also that the plan did not prevent a strike at our plant last year, when a good many of the men went out, those remaining being, in all probability, the same regular employes who would have continued with us whether the system was in effect or not.

We have no intention at this time of discontinuing the plan, but may, perhaps, add to it when the railroads furnish equipment sufficient to enable us to operate to maximum capacity. We believe the men should have a direct interest in maximum production and that systems of this kind, or an improvement on what we have done, will be increasingly popular in all lines of manufacture in the next year or two.

It is reported from Charles City, Iowa, that the Niles Gravel company has started making shipments of gravel and sand from its new plant.

A new industry for Fort Worth, Texas, is the electrically operated washing and screening plant for gravel and sand being installed by John B. Hawley, president of the Anaconda Gravel company, at a cost of $40,000, at the gravel pit located on forty acres leased by the company at Riverside.

Work! A Parody

Work!
I don't like the sound of it—
That is the helluvit,
Pounding away at the job I have got;
Why in the name of sense—
Work without recompense?
I'd rather not.

Work!
What is the good of it?
Just to get through with it,
Starting another job when that is done;
Wearing your life away—
What is the use, I say?
That is no fun.

Work!
All the world's doing it—
Not so you'd notice it,
If they could only do some other way;
What they all do, I vow,
Is what we're doing now—
Looking for pay.

Work!
Where is the end of it?
Never in sight of it,
Only to rest when you lie in your grave;
Only the honest work—
So say the ones who shirk;
Then I'm a knave.

A. Bolsheviki.
(E. G. Brown.)

Selecting Steam Shovels for Quarries

BY DANIEL J. HAUER

THE use of steam shovels in quarries is not new by any means, for in a limited way such machines have been employed in crushed stone quarries for several decades. Yet many quarries that can use them are not doing so. Today with the scarcity of labor and with high wages paid, all of which tend to give small production, when measured in man units, the question of picking up blasted rock by machine is brought to the attention of quarrymen as it has never been hitherto.

The use of steam shovels in quarries will not eliminate labor troubles entirely; but where a fairly large capacity of stone is to be handled in a day the labor required will be reduced by 80 to 90 per cent, and it is possible to continue work with but a few men. Another advantage is that with power drills and steam shovels few common laborers must be employed, instead drill miners, shovel engineers, and firemen, dinkey miners and train-men and crusher men at the plant will about cover the list, a much higher grade of workmen than the floating laborer, so that it is easier to hold such men and obtain from them a much higher efficiency in their endeavors. Most of these men can be paid a weekly wage and with a well devised bonus system many of them will stay with a company during the season and in some cases from year to year.

As another advantage with the use of steam shovels, night work can be done in a quarry with almost the same efficiency as day work is conducted.

There are several uses for steam shovels in connection with quarry work. The first is the stripping of the ledge. The methods of doing this work with power shovels has been described in this journal a number of times. The second use is that of picking up the blasted rock and loading it into vehicles to carry it to the crusher plant. The third use is that of rehandling crushed stone that may have been piled up as a reserve store during winter operation or when the sales have not equaled the output of the quarry during the regular season. Steam shovels are also used for rehandling the coal stored in reserve piles.

In spite of these facts the writer has noted a large number of quarries within the past few years having a daily output of 400 tons or more of crushed stone and found all the picking-up of blasted rock being done by hand, as it is in European quarries. Not only this, but many quarries with crusher capacity of 1,000 tons daily and opportunity to make plenty of sales, have only been producing 500 or 600 tons, due to using hand methods. This alone shows the need of using power shovels for the blasted rock. The shovel not only does the work much cheaper but it puts into an organization such pep and ginger as to change the operation from one with a drag to one with the highest spirits.

Another feature that has been noticeable is that a quarry operator may own a steam shovel, and although he may use it for stripping and other work, yet he does not employ it in picking up the blasted rock. He has tried it and has not found it very successful. This brings us to the consideration of the size and type of steam shovel to be used in a quarry.

Generally speaking, when a shovel is seletced for stripping a quarry, one of the lighter types on traction wheels

is chosen. As a shovel for this purpose must go high up over the ledges and over high ground, and as it is frequently difficult to get wagons or cars to it to serve it, it is a wise choice to select such a type of shovel; but to put this same shovel against the breast of a high ledge where deep hole drilling is done and large blasts made, it is not likely to do either cheap or quick work. With a dipper of lonly ½ to ¾ cubic yard, the rock must be broken up very fine for the shovel to handle it.

For such rock handling a steam shovel should be of large size and braced in operation with jack arms, with a dipper of greater capacity than 2 cubic yards. Such a shovel can not only stand up to the hard usage due to the heavy hard digging of a pile of blasted rock, but is able to pick up and load large boulders. It means not only a reduced cost of explosives in breaking boulders, but also in loading vehicles and in feeding the crushers.

For light stripping such a shovel is not well adapted, but it can be used where the stripping is heavy, although it will cost much more money to take it up on top of the ledge than the smaller type. For this reason many operators who use large shovels in their quarries do as little stripping as possible on top, but throw the most of the dirt and rotten rock down to the quarry floor, where their large shovels can handle it at a low cost. They figure that the slight increased cost of throwing the overburden to the quarry floor is offset by the cost of moving a heavy shovel, first to the top of the ledge and then back to the quarry floor.

One thing that has prevented a large number of quarry operators from installing steam shovels is not only the cost of the shovel, but the large capital expenditure made necessary for new cars and sometimes track. For large shovels, larger cars are needed than when hand loading is done. The rails and ties, in order to carry the heavy dinkeys and the heavier loads of stone, must be larger and heavier, and sometimes a broader gauge track is used.

For steam shovels, cars up to 18 and 20 cubic yard capacity are used, but in many cases much smaller cars are employed. In fact, in some pit quarries only 2-ton cars are used, as these are considered desirable to draw up the steep incline. A large number of quarries use a car of from 4 to 6-ton capacity, as these are considered ideal by many for dumping into the crusher.

The shovel can frequently be purchased on a lease sale agreement, and it is also possible to buy cars on the same terms. Rails, though, are generally sold for cash. If capital is not available to obtain all the equipment necessary, it is possible to use the old cars and track for a while, thus saving enough money by the use of the shovel over the old hand methods to be able to finance the purchase of rail later and to increase the number of cars or buy larger cars and the dinkeys.

Today another method of overcoming the financial difficulty of substituting a steam shovel for hand loading of the rock is in the use of auto trucks for transporting the stone to the crusher. Two-ton trucks have been used successfully for this purpose, thus doing away with all tracks and cars, except in pit quarries when the cars are used on the incline, the trucks being used to load the cars at the foot of the incline.

The trucks built with steel bodies and automatic dumps stand up to the work well. They can easily operate over the quarry floor if it is kept clean of blasted rock. The trucks also are easily dumped into the crushers.

To finance this proposition the quarryman has the opportunity of selling his old rail and cars. He can purchase the shovel and trucks on a lease sale agreement. Thus the shovel with trucks will quickly pay for itself.

Progress on New Illinois Plant

AT Gladstone, Ill., is afforded an opportunity for one to get an idea of the difference between old and new methods of quarrying.

Gladstone is over near the Mississippi river, just a few miles east of Burlington, Ia., and is the seat of operations of the Monmouth Stone Company, whose headquarters are at Monmouth, Ill. This company is installing a large modern plant at Gladstone. But the attention of the visitor is sure to be drawn to the weather worn quarry face, and he guesses at once that someone has been getting out stone here before. He is not mistaken, either; for many years ago the quarry was worked in primitive fashion, and the older inhabitants will tell you of the crude devices which got out a few tons of stone a week. But it was good stone—that they are willing to say for it; and they will tell you of some of the important structures of the state into which this stone has entered and is still doing good service.

Having seen this former operation, this older generation can scarcely comprehend the developments which are now in progress, including the rapid tearing away of materials with steam shovels, power drilling, the erection of immense steel bins, and the placing of heavy concrete foundations for the crushers.

The Monmouth Stone Company is incorporated in Illinois for $1,600,000. The officers are: President, J. H. Jayne, Monmouth, Ill.; vice-president, R. L. Everett, Kirkwood, Ill.; secretary, A. V. Peterson, Monmouth, Ill.; and treasurer, J. W. Houston, Kirkwood, Ill.

The company expects, when its plant is completed, to be able to turn out a wide variety of materials, including crushed stone, agricultural limestone, granite for building purposes, commercial sand and gravel, and molding sand.

The plant will be electrically operated, the power line now being put in to bring power from the big Mississippi River dam at Keokuk, Ia.

Cyclone Drill

The complete design includes six crushers and sufficient screening and storage capacity to take care of the output of these crushers. The bins and buildings are being built of structural steel.

The plant is only a few hundred yards from the main line of the C. B. & Q. railroad and about two miles of track will be put in at the plant to furnish adequate shipping facilities.

As will be seen from the illustrations, a Cy-

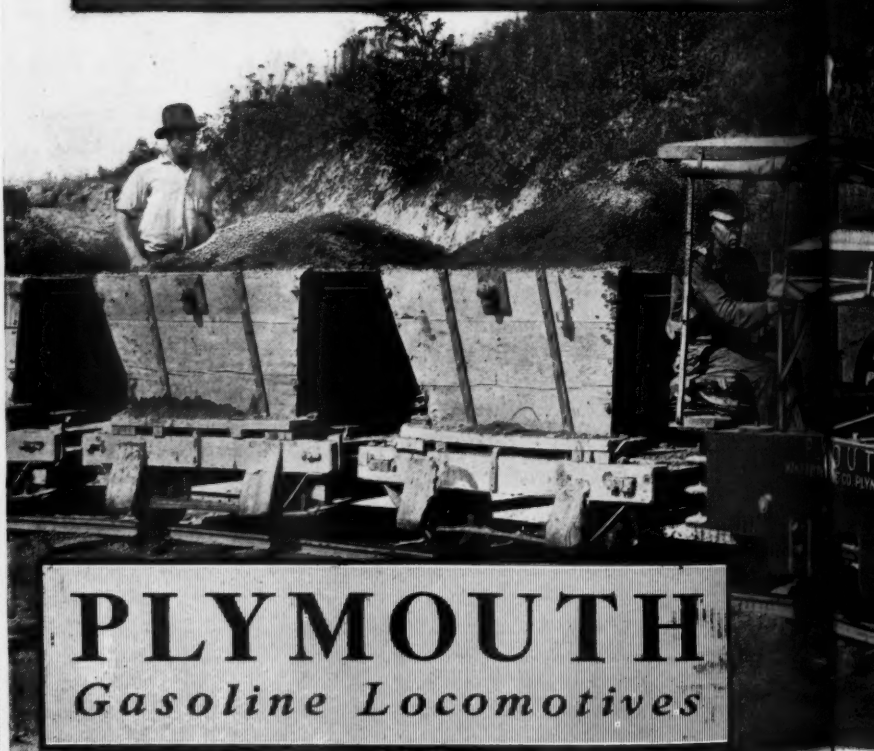
General view of quarry at Gladstone, Ill., also new and old faces, and mess hall.

Tells Others to Buy Plymouths

When an owner of two PLYMOUTHS thinks so well of his purchase that he tells others to buy PLYMOUTHS, it is a certain stamp of merit.

The Ayers Mineral Co., Zanesville, O., writes:

"Your Plymouth Locomotives are so economical and satisfactory that we have recommended them to others, and purchases have been made on our recommendation. We are glad to say a good word for the locomotives, and the people who make them, because of the fine service they give you after you have the machines."



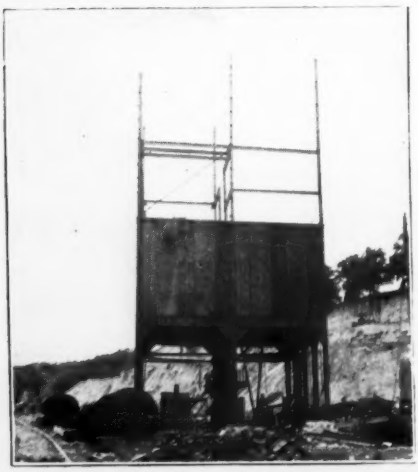
PLYMOUTH

Gasoline Locomotives

THE FATE-ROOT-HEATH CO.,

Plymouth, Ohio

The drill and steam shovels can be seen from almost any position.



The first section of the steel storage bins is shown on the left.

clone drill is on the job, drilling the ledge full of holes preparatory to the initial blast when everything is in readiness. Two Bucyrus steam shovels are also in operation and two Plymouth gasoline locomotives will soon be on the job.

All of the crushing, screening and elevating equipment will be furnished by the Allis-Chalmers Company, of Milwaukee. The company owns or leases 112 acres of land, and the limestone deposit on this land is reported by the Illinois Geological Survey to have a maximum depth of 100 feet. It is expected that the crushing plant will have an annual production of 500,000 tons, in addition to the other materials produced.

Pulverized Coal for Steam Generation

During the past few years fuel conservation has been a very important item in the industrial life of the nation and of the world. Increased interest has been taken in regard to the most efficient methods of burning fuel.

The development of the automatic stoker has reached a point whereby high efficiencies have been obtained and it is the opinion of many engineers that such equipment has reached its maximum development and if still higher efficiencies are to be obtained, some other method and type of furnace equipment must be used whereby more perfect combustion conditions can be constantly maintained.

All engineers who have investigated pulverized fuel claim that this is the most efficient method of consuming the various kinds and grades of fuel. The many advantages to be obtained through the use of pulverized fuel have been known for many years but the practical application, particularly to boiler furnaces, has only been developed during the past few years.

High temperature and high velocities are the known causes of destruction to furnace refactories, and with these factors under control, long life of the furnace refactories is assured.

The operation of a pulverized coal equipped boiler furnace is comparable to a similar furnace operated with oil or gas, the only additional item entering into its operation is the removal of ash.

Automatic regulation of both fuel and air can be readily applied. A pulverized coal fired furnace is remarkable for its flexibility between wide ranges of load and the practical elimination of standby losses.

Starts Bathing Beach for Employees

Which Ought to Be Easy, with So Much Sand Around

AN innocation in the way ot employes' welfare work has been inaugurated at the plant of the Lincoln Sand & Gravel Company, Lincoln, Ill. This is a fine bathing place, and the principal credit for this is due Mr. Sam McNeil, superintendent of production for the company.

Mr. McNeil, who recently came from the East to take over the superintendency of the plant, has gained the good will of the men under him to a considerable degree, owing to his efforts for the betterment of their condtion in every direction. It was with their help that the gravel beach was recently thoroughly cleaned, leveled and a fine diving board installed and all obstructions removed.

He and his men intend to see that those who enjoy the beach conduct themselves with propriety and anyone who fails to comply with this rule will be forbidden the liberty of the beach.

Nothing of this kind has ever been attempted at Lincoln, and Mr. McNeil and his assistants are entitled to much credit.

When Mr. McNeil took charge of the plant the output was 42 cars per day, which has been increased to 58 cars since Mr. McNeil took charge. The men are willing to do whatever he asks of them and to this fact is due the success of his work.

Single Unit Versus a Central Plant for Sand and Gravel Pits

BY DANIEL J. HAUER

IN STARTING sand and gravel pits and banks there are two distinct ideas of designing and building the necessary plant. One is a centrally located plant to handle all the product of the pit, while the second is to have a number of individual units, each being complete in itself.

Each of these plans possess advantages and disadvantages, depending on the size of the project and likewise on the local conditions and the necessary capital available.

The sand and gravel business has been a wonderfully profitable venture for some operators, while on the other hand there have been many failures in the business, so much so that in some sections it is considered a precarious venture. This in some instances has been due to the fact that too much money has been spent at the start in development and plant, more than was justified by the business in sight; and even when plenty of business was obtained, the overhead charges were so high as to prevent competition, at a profit, with smaller operators, who had little if any overhead expense.

Capital is always essential in any business; yet strange to say the writer in his experience has seen many projects brought to ruin by too much available money at the start. An explanation may be necessary to impress how this can be true. A sand and gravel company was organized in a large city and a capital of more than $50,000 was made available at once. With this a large and expensive plant was designed and built, commodious offices were rented and other expenses were incurred, so that this company could not compete with smaller operators, and within two years the plant lay idle. If these promoters had had only a limited amount of capital the business would have been built up gradually, expenses would have been kept down and as the experience was gained and money earned, the plant could have been enlarged.

One of the largest and wealthiest corporations in the east, engaged in the sand and gravel business, besides other large operations recently started the development of a new pit, using first a small unit, then several units, and had earned many a dollar before a large investment was made in plant. This was certainly good business. As this company has available millions of dollars of capital, with unlimited credit, it was a course pursued by the dictates of sound business judgment rather than any need of money to build a large central plant.

If the development is one of a high bluff or bank and it is only possible to get a railroad siding in at one point and only of moderate length, or only one wagon road can be taken to the bank, then the physical conditions are such that a central plant for washing grading and loading, is likely to be the only solution of the problem.

Then, too, if the method of excavation and handling the material is to be such as calls for a central plant, one must be established.

Even under these conditions it may not be necessary to build a very large plant. It is frequently possible to design a plant so that only a part of it need be built at first, then as the development progresses it can be enlarged not only once, but several times until the central plant is large and capable of producing a large daily tonnage at a small cost.

It must not be thought that the writer is advocating the building of a

crude makeshift plant, or one put together as a patch-work affair. Such a plant will not only never prove satisfactory but the cost of the plant will be excessive and its operation expensive. No matter what type of plant is to be built, it should never be started until a competent man designs it and makes the proper working drawing. This design should not only take into consideration the present needs as to plant, but show how future additions are to be made, and be an integral part of the original plant, not only as to operation, but likewise how additional storage for products is to be provided and how the stock is to be rehandled at a low cost.

This season, with the present car shortage, hundreds of pits that only have railroad shipping facilities are handicapped, due to the fact that extra storage was not included in the original plan and layout and likewise no provision was made for economical rehandling. Thus they cannot compete with other plants.

It is safe to say that more money is wasted in starting new pits, due to the lack of plans and designs, than by any other way. Recently the writer has been watching a small development where 100 tons of sand and gravel is to be produced daily. Although not over a thousand dollars has been expended for plant, a third of this will prove a waste, for the head of the firm recently has stated to the writer that before they can operate successfully, they must change their plant and expend at least another thousand dollars. This was the start, and he feels safe in predicting that the greater part of a third thousand dollars will be spent before the desired results will be obtained. A waste of 30 per cent or more will be entailed, while if adequate plans had been prepared this waste would have been eliminated.

A couple of hundred dollars spent in plans may mean the saving of thousands in construction and operation.

Single units of plant possess many advantages over central plants under most circumstances. They are quickly installed. They can be made very complete from the start, can be readily enlarged if built along the proper outline, and are generally economical in operation. If additional sales call for a larger output, at a comparatively small cost new units can be installed. If a lull comes in business and the output of the pit must be curtailed, one or more units can be shut down. Power is saved at once and likewise labor. Large engines and motors do not have to be continued in operation to produce a limited amount of material as is the case with a large central plant worked to a quarter or a third of its capacity.

In some pits the materials vary considerably; sand may predominate in one place and gravel in another. With a central plant all the materials must go through the same machines. With single units, some can be designed for one class of material and some for another, thus keeping materials that are to be separated in the end, separate at the start. This is frequently a great advantage, saving both time and money. Then, too, some of the materials may have to be washed, while others may not have to pass through the washer. This also means a saving in the cost of production.

One unit could be designed to handle gravel with an excess of sand, another to handle sand with a large percentage of gravel. These will prove economical rather than to pass all materials through the same machines.

A hard and fast rule cannot be laid down to decide these things. It must be decided for each case upon its own merits, yet it takes judgment based upon long experience and intimate knowledge of the project itself and all the conditions surrounding it, and knowledge of the design and construction of plants, as well as of all kinds

of machinery on the market that can be adapted to this kind of work.

In spite of this many operators, with little or no experience in building plants, and sometimes without much experience in operating them, decide in an off-hand manner on their plant, only to lose money on the project, and in too many cases they never realize that the project has been a failure because they did not know what kind of a plant to build or how to operate it.

During the past year the writer has seen this happen several times, in spite of the fact that experts can be employed to prevent such failures—men who have had years of experience in selecting machinery, in designing, laying out and building plants, as well as operating them.

Many sand and gravel men have had years of experience in operation, but few of them have built more than one or two plants, so that naturally they cannot expect to have the experience of men who may design and build a half dozen plants in a year. The money paid to such men is well spent, for it not only means money saved, but it may mean success or failure.

An expert is very careful in making decisions, for he cannot afford to make mistakes and cause money losses for his clients, as his reputation is easily affected in this way.

The Lakewood Sand Company, 110 South Bridge street, Somerville, N. J., was incorporated on June 28. The amount of this company's capital stock is 2,000 shares without any nominal or par value. Louis P. Gaston, Thomas Richards and Elmer L. Richards, of the Somervlle, N. J., address, are the incorporators. This company intends to buy, sell, lease, develop and improve, sand and gravel properties; and mine, quarry, sell and market any and all of the products thereof.

The Southern Sand, Gravel and Supply Company, Columbus, Ohio, recently increased its captal stock from $30,000 to $60,000.

Trying to Get Cars

Manager Sutton Gives Latest Suggestions for Producers to Act Upon

UNDER date of July 23, E. Guy Sutton, business manager of the National Association Sand and Gravel Producers, addressed the following letter to the organization:

The Commission on Car Service of the American Railway Association is now passing through another period of reorganization. It will now operate under the direction of an Executive Manager, to be appointed by the Advisory Committee of the Association of Railway Executives, of which Mr. Daniel Willard is chairman. In addition to supervising the work of the Commission on Car Service, the executive manager, yet to be selected, will "deal with questions arising between the carriers and the Interstate Commerce Commission."

Mr. D. E. Spangler, formerly general superintendent of transportation, Norfolk & Western railway, and recently appointed to the Commission on Car Service, now has charge of the distribution of open-top cars. Attached herewith you will find copy of letter received from Mr. Spangler, following a series of conferences which I had with him subsequent to the hearing before the Interstate Commerce Commission on July 8-10.

In view of the suggestions and recommendations contained in Mr. Spangler's letter, it seems appropriate to repeat in substance the plan of procedure outlined in my Circular No. 2-1920.

1. Endeavor to secure cars in the normal way through the local, division and general officials of the railroads serving your plant. (Application to the Terminal Committees of the Commission on Car Service may prove helpful in some instances.)

2. In the event cars are not furnished after exhausting every ordinary means, then submit report, using the enclosed blank, to the National Association, and your case will be taken up promptly with the Commission on Car Service for attention.

It will be of great assistance in investigating each situation if a railroad

map or a rough sketch is submitted with your other information, showing the location of your plant and the points to which you desire to make shipments, stating also whether the movement is in the direction of or away from the coal mines. It is especially desirable to have full data, not only to hasten the handling of the complaint, but for use in the event it is necessary to ask the Interstate Commerce Commission for authority to deviate from strict compliance with the various Service Orders, as will be done in specific cases.

It is urged again that you try your best to get satisfactory service from the railroads before asking for help, but do not hesitate to send in a report if cars are not furnished, being sure to give clear, accurate data. Mr. Spangler has opened the way for co-operating; it is your privilege to take advantage of the offer.

The letter from Mr. Spangler, to which Mr. Sutton refers, is as follows:

To establish co-operation between the gravel and sand shippers and the serving railroads, the first essential, it would seem, is a full understanding of each other's situation and needs, and the character of service to be performed in each instance. To this end the shipper should deal directly with the local railroad management before coming to any authority at Washington—the advisability and necessity for this are obvious.

In handling these matters with the initial railroad, we regard it important for the shipper, in placing requisitions for cars, to transmt all essential informative facts with respect to the variable type of equipment that can be used, destination and full route of shipments, actual daily loading ability and the uses to which the production is to be devoted. Full information in every respect will be suggestive of the greatest permissible service that can be attained from car movement in harmony with the general regulations in respect to car handling that may be necessary for the Interstate Commerce Commission or the American Railroad Association, through its Commission on Car Service, to institute from time to time.

Also the Commission on Car Service has committees at a number of strategical interchange and terminal points, through whom applicants can work when local roads are unable, from their own resources, to meet a situation. You probably have a list of these committees; if not, we shall gladly furnish you one.

When local railroads are unable to meet a situation they naturally will inform the applicant of the reason, whereupon the shipper is likely to seek assistance from authority of more extended jurisdiction than that of the individual local road; if a shipper considers it desirable or necessary to go farther than the local road with the intention of ultimately aplying to some Washington authority, it seems to me it would avail most to conduct such negotiations through his Washington representative, if he has one, or through his Trade Association representative where such relation is established; in all instances full information as indicated above should be supplied, together with correct advice of prevailing car distribution, so that when the application reaches a Washington authority, comprehensive action can be taken.

Uniform Lime Law

Agstone Association Is Getting Ready to Cooperate

IN sending out a report under date of July 24 to the members of the National Agricultural Limestone Association, Secretary Souddles states:

Mr. Kanengeiser of Bessemer Limestone & Cement Company, Youngstown, Ohio; W. M. Brown, France Stone Company, Toledo, Ohio; A. B. Meyer, Mid-West Crushed Stone Quarries Co., Indianapolis, Ind., have all accepted appointment as members of legislative committee to consider and act upon proposed national uniform lime law.

E. O. Fippin, secretary of the Lime Association, has forwarded copies of this proposed law and same have been mailed to members of our executive committee.

Mr. Kanengeiser will request his legislative committee to meet with executive committee at its next meeting which Chairman Blair will likely call in a very few days.

Many of our Agstone members who have given thought to this proposed uniform law consider it extremely important.

Able to Proceed With Work in New York

Evidences of Activity in Other Parts of Eastern Territory

THERE is more pronounced activity in the sand, gravel and crushed stone markets in New York, due to the fact that construction operations under way are now able to proceed with incoming supplies. Local freight embargoes, however, are still making for considerable difficulties, and it is only through the energy and enterprise of the "live wires" in the building material field that such items as cement and lime are placed on the job.

The stone and gravel producers are in much better position than some of the manufacturers of important building commodities to keep up with the demand, as the bulk of material of this nature is handled by water route in the New York and Northern New Jersey districts.

Prices are on the upward trend—of this there is no question, and according to the views of prominent men in the industry, the end is not in sight. The Fall season with any sort of activity, bids fair to usher in higher levels. Sand is selling in wholesale quantities, cargo or carload lots, at $1.50 per cubic yard, while dealers are asking about $2.75 to $2.90 for the material delivered on the job. Gravel holds at $3.00 per cubic yard in cargo lots for ¾-inch as well as 1½-inch stock; for current building work, dealers are receiving $4.25' for good washed gravel, first zone deliveries. Fine white sand is being quoted at $5.00 a cubic yard, delivered in Manhattan Borcugh. In the matter of crushed stone, there are no changes, and prices remain as set forth in the last issue of PIT AND QUARRY; ¾-inch material is selling in wholesale lots at $2.15 per cubic yard, while 1½-inch stock is securable at $2.00. Dealers are asking $4.25 for crushed stone, delivered.

Portland cement is slated for another rise early in August. The figure of $4.80 a barrel holds at the present time, but it is only really a "quotation," because the material is not by any means to be had in full quantity desired.

The Edison Portland Cement Company is making extensive additions in its boiler plants at its mills, New Village, N. J., for increased capacity. The present plant will be entirely remodeled, and a number of new boiler units of Babcock & Wilcox type will be installed, with considerable auxiliary equipment. The entire work is estimated to cost about $300,000.

A new stone producing company has been organized at New York, with name of the Maine Black Diamond Granite Company, and headquarters at Middle Village, L. I. The incorporators include Solomon Goldstein, operating a monument works at 171 Suffolk Street, New York; F. Lyons and F. T. Lang.

The Monolith Granite Company, Peekskill, N. Y., has been formed with a capital of $250,000 to operate local quarries. The company is headed by G. H. Fabian, Jr., E. Schmid and S. H. Rosenfeld, all of Peekskill.

The Watertown Stone Products Company, Watertown, N. Y., has been organized with a capital of $10,000 to produce crushed stone, sand and kindred materials. S. D. and C. M. Ormsby, and M. J. Davis, Watertown, head the company.

Producers depending on railroad facilities in New Jersey and Pennsylvania have been forced to curtail operations during the past few weeks, owing to car shortage. In New Jersey, there has been continued good call for sand, gravel and broken stone, and if stocks could have been moved, as de-

sired, many plants would feel far more satisfied. In the Raritan River section, there is considerable activity in sand production at the Bloomfield Clay Company properties, Metuchen.

Large quantities of broken stone are being used in New Jersey for road work, and the different counties are growing very active in construction and repair work of this character. At Flemington, the Board of Freeholders will soon award contracts for road building to cost about $60,000. In Sussex County, the Board of Freeholders is showing great preference for gravel highways, and a number of roads of this nature will soon be built. Such type of road, it is held, is distinctly economical; it can be constructed for from $8,000 to $10,000 a mile, and in matter of upkeep, there is no comparison with the prevailing costs of maintenance of other kinds of highways. Moreover, the argument is presented, that the gravel road is the most comfortable to ride upon when kept in good condition.

The J. H. Morris Company, Trenton, N. J., has secured considerable sand property at Deutzville, formerly held by Edward H. Cleaver of Freehold, N. J. The pits are considered among the best in this section, and the new owner is planning for extensive production. The company is now operating other properties in the same district, and it is proposed to develop a total output of about 100 tons of sand per day.

Sand, crushed stone, cement and other interests in the Lehigh Valley district of Pennsylvania are giving considerable attenton to the Lehigh Valley Safety Council. The organization is designed to eliminate accidents and injuries to employes at the different industries in this section, and the results accomplished in this direction speak high for the energy and activity of those responsible for the movement. Meetings are being held at regular intervals at Allentown. E. C. Spring is president of the Council.

Active operations are under way in sand and gravel production in the Pittsburgh, Pa., district, and the larger companies hereabouts have orders on hand far ahead of production. The J. K. Davison Sand Company is arranging for the construction of a new steel sand digger, to be operated with its already large fleet; it is proposed to make the boat the most modern of any similar craft on local waters. The company is completing a new hoisting boat, known as the No. 4, at the shipyards at Aspinwall, and will soon launch the vessel; it will be one of the largest boats of its kind in this district.

The Wilson Sand & Supply Company, Pittsburgh, Pa., is adding to its fleet and has purchased the steam sternwheel towboat, "E. Stanley Holland," from the Bates & Rogers Construction Company, Chicago. The boat is rated at 71 tons capacity, and will be renamed "John T. Wilson," in honor of the founder of the company, and father of C. R. Wilson, now president. The hull of the vessel aggregates 22x 103 feet.

The McClain Sand Company, Point Marion, Pa., has acquired considerable new machinery for use on its dredge boat No. 4. The company is one of the active producers of this section, with large daily output.

For a consideration of about $44,000, the Valley Sand & Supply Company, New Kensington, Pa., has acquired the steamer sand digger, "F. M. Bowers" from the New Martinsville Sand Company, New Martinsville, W. Va. The boat will be placed in service by the new owner at an early date.

The Green Stone Products Corporation, First National Bank Building, Roanoke, Va., will purchase considerable equipment for its proposed new stone quarry in the vicinity of Thurmont, Md.

Material Market Revives

Louisville Reports Demand for All Products Which Can Be Shipped

By Our Louisville Correspondent

WHAT is easily the outstanding feature of the trade situation in the Louisville territory is the car shortage and the general distressing condition in the matter of transportation. As this is common, however, at practically all other points it need not be dwelt upon at length as a feature peculiar to this territory. But it is a dominant factor in limiting both quarry operations, and the movement of sand and gravel in carloads to distribution points throughout the state.

An interesting trade feature is a noticeable revival in the call for building material which is adding more zest to the trade in sand and gravel for this purpose. Building operations have been dragging and building material markets were rather flat until about a week or two ago. Since that time there has been a noticeable increase in activities among the material yards handling sand and gravel in the surrounding territory and there are some local prospects being planned which add encouragement to the building situation in Louisville proper. The most conspicuous of these is a terminal project on the part of the L. & N. Railroad in South Louisville, which will involve improvements which it is estimated will cost $10,000,000. This should mean some very active structural work in the railway and industrial center in the south part of town and an encouraging addition to the local requirement in river sand and gravel for concrete work.

At a meeting held in Lexington, July 15th, of retail coal dealers, many of whom are also handlers of sand and gravel, it developed from the discussion among those attending that there is a noticeable improvement in the call for building material now from the agricultural districts where formerly they were too busy farming to undertake building. This is taken to illustrate the beginning of a busy fall season which will furnish a good demand for sand and gravel. The main problem is that of getting cars and being able to meet the demand promptly.

The good roads work getting under way in the state is stimulating quarry operations and making an active demand for quarry machinery and equipment for handling crushed stone.

The Roy C. Whayne Supply Co., who deal in concrete mixers, contractors' supplies and quarry equipment, report that building operations have been a bit slow lately and this has caused a temporary lull in the demand for mixers. There has been an active demand, however, for tractors and quarry equipment and every indication points toward an increase in the demand for these items and for road making equipment generally. Also they feel that the late summer and fall will bring a revival in the demand for concrete mixers.

J. E. Lloyd, of the Louisville branch of the E. T. Slider Co., says that the local trade in sand and gravel has been a bit quiet lately as it is the mid-summer dull season. They have a very good demand for carload shipments out of town and this trade is hampered somewhat by car shortage, the same thing which is hampering the movement of sand and gravel everywhere.

Mr. Lloyd had hoped to be in attendance at the Lexington gathering of coal men and building material dealers but was too busy to get away from his work here.

The Dow Wire and Iron Works, makers of the Handy Andy equipment for handling stone, sand and gravel, are laying plans for more extensive operations. They were heretofore

handicapped some through shortage in raw material, and they are now busy striving to get more of the raw materials required and when this is forthcoming expect to enlarge their operations somewhat in their labor-saving equipment for handling sand and gravel, etc.

Over on the New Albany side of the river, Floyd County has purchased the New Albany and Corydon pike and also the stone quarry operated by the pike company and has made a contract with Samuel T. Gaines for the sale of the stone in the quarry at 7 cents a yard. It is estimated that there is a total of approximately $84,000 worth of stone in the quarry. Mr. Gaines expects to sell the stone to the Indiana State Highway Commission.

Activity in Indiana

Aggregate Producers Working to Protect Their Interests—Brief News Notes

By Our Indianapolis Correspondent

SAND and gravel men in Indiana still are seriously handicapped because of the car shortage. Probably never before in the history of the state has there been such an opportunity to sell sand and gravel, but with the car situation as it is, the trade will do well if it makes just an average increase over last year.

Sand and gravel men are interested in proposed legislation backed by officials of the Indiana State Highway Commission asking that a levy of 30 cents on each hundred dollars valuation be made against all assessable property, the sum to be spent in improving roads. The legislature is now in special session and it is understood that the highway commission will be satisfied to have the levy cut to 20 instead of 30 cents.

A petition was presented to the Board of County Commissioners of Marion county recently asking that it modify specifications for materials to be used in the construction of the McAlpin road in Perry township so that gravel available in Marion county might be used. The commissioners were asked also to withdraw the supervision of the state highway commission as the contract for the construction of that road was let before the law providing for inspection of county roads become effective. The commissioners have taken the petition under advisement and it is probable that the petition to modify gravel specifications will be granted, as an investigation by the state board of accounts showed that the Marion county gravel will make sufficiently good cement as to come up to that required in the specifications.

Road and street contractors in the vicinity of Indianapolis are making every effort to jar some gravel loose from the producers. Producers say they can not ship gravel unless they have cars. The sudden anxiety on the part of contractors is the result of orders from the Board of Public Works of Indianapolis saying that speed must be shown on construction if contractors expect to receive additional contracts from the board. Members of the board say they realize that contractors have been handicapped by delays in getting materials due to the railroad situation and are ready to make due allowances, but that some have not shown a disposition to push the work after they have had material on the grounds.

Because of a famine of cement in the vicinity of Clinton, Ind., building and road construction has been balked to a great extent. The local dealers have little cement in stock and are only attempting to supply for small jobs. Some contractors are hauling cement in from distant points in order to keep road construction work going.

The trade was considerably interested in a recent order of the state highway department to the effect that county road plans submitted to the county aid division of the department must conform to the standards the commission has established before they will be approved. The standards are similar to those established by the federal government and which the state is required to meet before it can obtain federal aid. The action of the commission is intended to standardize road construction in Indiana, whether done by the commission or by the counties with state aid.

County officials of Floyd county expect to make some money for the county from the toll road and quarry property purchased by the Board of County Commissioners recently. Twenty-one acres of land were included in the quarry property and a road contractor has contracted for 52,000 yards of rock at seven cents a yard.

More than 100 volunteer workmen, who shoveled for nearly two hours, June 30, rescued James Warner, fifteen years old, who had been held beneath a pile of 100 tons of water-soaked gravel at Warsaw, Ind. The boy, an employe of the plant of the Warsaw Sand and Gravel Company, near Winona Lake, was working at the top of a 60-foot gravel bin which leads to the chute from which cars are loaded. Te stepped to the top of the loose gravel in an effort to start it toward the chute and was carried down into the mouth of the chute where he lodged. He was not seriously injured.

The Burress Gravel Company, of Shoals, Ind., recently incorporated to operate a large gravel deposit near Shoals, has applied to the state public service commission for an order to compel the Baltimore & Ohio Southwestern railroad to construct a sidetrack to the deposit.

The Eaton-Kaster Gravel Company, of Indianapolis, has filed articles of incorporation with the secretary of state. The company will produce sand and gravel and other building materials. The directors are Arthur E. Eaton, Robert C. Kaster and William H. Tudor.

The Logansport Stone and Lime Company, of Logansport, Ind., recently incorporated with a capital stock of $250,000. The company will manufacture and sell limestone. The directors are Peter Martin, Jacob Dick and Wesley W. Hawley.

The Kickapoo Sand and Gravel Company, of Terre Haute, Ind., has increased the number of its directors from three to five.

"Has Put a Crimp In Us"

That Is What Buffalo Producers Say About the Open-top Car Order

By Our Buffalo Correspondent

SAND and gravel men here complain that the order turning all open top cars to the mines has hit them a blow which has nearly put them out of business for the time being.

"While we can send materials in the direction of the coal fields, we cannot send anything in any other direction," said one sand and gravel company man.

The sand and gravel industry in Buffalo has supplied a wider field than usual earlier in the season. With slight recovery after the two switchmen's strikes of unauthorized origin, they were able to get shipments to Syracuse, Binghamton and Elmira points. These were for construction work.

Aside from these they have shipped much material to points in Pennsyl-

vania south of here, mainly for good roads work.

Now, with the new order they are able still to get some stuff into the Pennsylvania fields because that is in the direction of the mines. However, the shipments in the eastern directions such as Syracuse and Binghamton; Elmira and other points in that section are practically out of the question.

"It has certainly put a crimp in our business for the time being," said one representative of the biggest concern of its kind here.

This firm has also just developed business to the west of this city and all around has been doing a wider business and covering a wider field than ever before, in spite of recent shortage of cars, labor conditions and strikes. But this last order has stopped everything but in one direction—that of towards the mine fields of Pennsylvania, West Virginia and other coal mining fields.

Also switching within the city of Buffalo from one section to another has been stopped and all of this business now has to be done by motor trucks. It is said that motor trucks are doing a 100 per cent efficiency business, however. The companies even send materials for construction work to the Tonawandas, Niagara Falls and other near-by cities. Without motor trucks, the companies would be nearly at a stand-still.

The labor situation is reported as improving. Workers are sticking better than earlier in the spring and there is not much uncertainty regarding men shifting because of discontedness or for a desire for high wages at some other work.

Prospects for fall building, which will greatly boost the business, are reported as excellent.

"Indications are that there will be a large development in all kinds of building this fall," said one sand and gravel man. "While we are in the doldrums now we are confident of good headwinds and swift travel within three months when the fall business starts its boom. And we see a big building boom ahead."

So, after all, it may not be so bad. With the silver lining likely to be turned the other side out by fall, the local sand and gravel men are looking for a big season ahead—one which will wipe out all the troubles of the late winter and spring.

Buffao has never gone behind and it is promised that it will soon go ahead big. At present there are not nearly enough houses here to sufficiently make homes for the workers. The census showed a sizable gain, however, and the city is now past the half million mark. Several large plants—one to employ 5,000 men—are under way.

So the outlook is not at all bad.

Canada Needs Cement

Much Work Delayed on This Account—Rail Rates May Be Increased

By Our Toronto Correspondent

SUPPLIES of building materials in Canada are reported as being fairly plentiful this month. The amount of cement available is not equal to the demand, however, due mainly to lack of coal and of railway cars to bring it into Canada from the mines. A number of plants of the Canada Cement Company are temporarily closed, and some construction work is help up as a consequence. The cities of Ottawa, Hamilton, Chatham and Brantford, in Ontario, have all delayed public works on this account. Brick and stone are plentiful. Some of the Ontario counties are unable to secure cut stone for road work now under way.

Builders and contractors in Canada are concerned over the application of

the Canadian railways for an increase of 30 per cent in freight rates, which is to be heard by the Board of Railway Commisioners on August 10. The Ontario government, for instance, has just embarked on the construction of 1,800 miles of roads, the cut stone for which has in many cases to be hauled a considerable distance. "If the proposed increase in freight rates comes into effect it will put commercial stone off the market," said Hon. F. C. Biggs, minister of public works and highways for the province. "I think the Dominion government should do something in the matter. It contributes to the cost of roadbuilding in Ontario, and its contribution is eaten up in transportation charges."

Referring to the work in Ontario, the minister said: "We will have to depend on local materials in each district. We own some 30 or 40 stone quarries and about 100 gravel pits now. We cannot afford to pay any more for stone than we are paying now. If the price goes up we will have to secure quarries and gravel pits and locate a plant in each district. If it were not for the crushers and tractors we purchased early in the year we would not be able to have machinery now. Delivery of equipment cannot be secured. We are 100 cars behind in the delivery of our orders for cement for culvert work. Gangs of men are being laid off on this account."

The amount of building going on in the Dominion is substantially more than last year, according to figures compiled for the first four months of the year. The values of buildings under construction up to May 1, compared with the totals for the year 1919, are as follows:

	1920 (4 mos.)	1919 (12 mos.)
Frame residences	$3,500,000	$11,721,600
Brick residences	13,035,700	32,291,500
Frame commercial buildings	1,572,200	4,165,500
Brick commercial buildings	22,808,600	48,183,900
Concrete commercial buildings	3,833,600	7,157,000
Frame industrial buildings	658,500	750,700
Brick industrial buildings	17,731,100	30,314,200
Concrete industrial buildings	13,375,000	26,025,400
Steel bridges	1,445,700	1,953,800
Concrete bridges	199,500	566,300
General engineering works	9,165,100	23,590,400

Buildings permits issued in the 56 cities in Canada during May totalled only $12,160,379, however, compared with $16,385,153 in April, and $7,776,282 in May last year.

Must Collect Tax

Dealers in building supplies are required to collect taxes from the purchaser, under the new Dominion tax law which took effect June 17th. In respect of sales by manufacturers to retailers and consumers or on importation by retailers and consumers, the tax is 2 per cent. The tax must not be included in the price, but must be shown separately. On sales made by the manufacturer to the wholesaler or jobber the tax is 1 per cent, and on sales made by wholesaler or jobber to retailer or consumer there is another 1 per cent.

The Ontario government recently stopped the taking of sand and gravel from Pelee island, at the western end on Lake Erie, by United States contractors, on the ground that it was injuring the land in the vicinity. To enable the companies to fulfil their contracts, however, the government is now allowing them to work at Dummy Island, about 15 miles southeast of Point Pelee in Lake Erie, permits being issued for this purpose for such time as is necessary.

A brick plant and kiln is to be built at once by the Surrey Brick and Clay Products Company near Cloverdale in the Chilliwack Valley, British Columbia. An extensive clay deposit is located about 1 mile north of the city, and the market for brick in the district is good.

Beats Previous Years

Items of Interest from the Pacific Coast Producers.

By Our San Francisco Correspondent

ALTHOUGH road work has been halted in some sections by the sale of bonds being held up with the general tightening in the money market, there is enough construction work of one kind and another in progress and scheduled to start right away to keep the demand for sand, gravel and crushed rock up to top notch. All the quarries around here are operating, and some are having difficulty in keeping up on orders, which continue larger in the agggregate than were booked during the corresponding period of previous years. In common with the brick plants, there is still a shortage of labor in this business, but the situation is reported somewhat improved in this respect within the last few weeks. Likewise, the car shortage is becoming a less important consideration, deliveries of cars being made about as needed.

As far as the local demand for materials is concerned, the construction of many large buildings in the downtown business district of the city has a stimulating effect. Among the structures now in progress, more or less out of the ordinary, may be mentioned the wholesale grocers' building of the Southern Pacific Company to cost $1,500,000; the fifteen-story office building at California and Battery streets being erected by the Balfour-Guthrie company at a cost of $1,000,000; the twenty-story Standard Oil building at Bush and Sansome streets to cost $1,500,000; the Bank of Italy building at Powell and Eddy streets to cost $1,000,000; the sixteen-story office building of the California Commercial Union at Pine and Montgomery streets which wll cost $2,500,000, and the million-dollar building of the California Pacific Insurance Company at Bush and Montgomery streets. Other large buildings are also scheduled for construction this fall, which should make the last half of 1920 particularly active for building materials quite generally.

Arrangements have been completed whereby the county of Imperial, California, will take over Frank Spring's gravel pits in the northern part of the county and will immediately spend about $50,000 on improvements. The plans include the building of a tramway to the main line of the Southern Pacific railroad and the installation of steam shovels and other modern equipment with which to handle materials for highway work in the county. It is pointed out that $1,500,000 is to be expended on road construction in that section of the state.

The 1,000-ton sand and gravel plant of the Nevada Department of Highways has been placed in operation at Lahontan, Nev.

At a recent meeting held at Florence, Ore., the North Fork Grange No. 493 went on record as opposed to paving state roads and urging that the construction be confined to macadam and crushed rock, according to copies of resolutions received at the executive offices in Salem, as follows:

"We protest against the further expenditure of moneys for paving and respectfully insist that macadam or crushed rock will be cheaper and will make a larger mileage of roads that will be almost as good for automobiles and superior for teams, and that in justice to the farmers of the state and the consumers of farm products such macadam roads ought to be built at this time.

"We further ask that in making any changes in the personnel of the state highway commission you will appoint only such as are in favor of building crushed rock roads."

Unjust Cement Rates

Lehigh Company Upheld in a Tentative Report on Tariffs from Mason City

A finding that rates on portland cement from Mason City, Iowa, to points in North Dakota and to destinations in Minnesota north of the line of the Great Northern extending from Duluth, through St. Cloud to Granite Falls, and north of the rails of the Chicago, Milwaukee & St. Paul from Granite Falls to the northern boundary of South Dakota are unreasonable, is proposed by Examiner F. W. Heid in a tentative report on No. 10422, Lehigh Portland Cement Company vs. Midland Continental Railroad Company et al. His proposal is that they be held unreasonable to the extent that they exceed rates based on an arbitrary of five cents to St. Paul, plus scale III rates or an average of scales III and IV, as increased by General Order No. 28, to points in scale III and IV territories, the territories and distances to be in accordance with the boundaries and rules of computation laid down in the supplemental report in the cement case (52 ICC 225), the original of which was reported in 48 ICC 201.

A further finding proposed by the examiner is that rates from Mason City to the same points are unduly prejudicial to Mason City, to the extent that the rates from the Iowa manufacturing point exceed those from Duluth by more than the differences between the rates on the basis proposed in the first finding and the rates under scale III, or under scales III and IV, as increased under General Order No. 28, to points in scale III and IV territories, respectively.

All shipments from St. Paul and many from Duluth, according to Heid's report, pass through scale II territory, and, according to the examiner, the provisions of the fourth section should be observed in respect of rates over the direct route.

The complaint was made by the cement company with plant at Mason City on the ground that its competitor at Duluth (Steelton) had the benefit of an adjustment of rates that gave it an undue advantage. Cement manufacturers at Mason City, Duluth, Hannibal, Mo., and other points intervened, some in behalf of the complainant and some in opposition.

No defense was offered by the carriers in this case on the ground that the issues presented were considered and passed on in the cement case; or, in the alternative, that if the motion to dismiss the complaint was denied, the cement case be reopened for further investigation and consolidated for hearing with this proceeding. In support of the latter motion the railroads suggested that if any change was made from Duluth, changes would have to be made from other producing points. The Commission denied a motion by the Universal Portland Cement Company, with a plant at Duluth, for a reopening of the cement case to the extent necessary to deal with the complaint in this case on April 7, 1919.

In answer to the suggestion that the larger case ought to be re-opened the examiner said that in the big case the Commission did not pass on the measure of the rates from Mason City or on the rates from Duluth. All it said was that the basis of making rates on the combination of locals on St. Paul was not unreasonable. Therefore, he suggested, the Commission should hold in this case that a proper relationship of rates as between Mason City and Steelton was not determined in the big case, so that the subject was open for determination in this one.

As a foundation for his recommendation, the examiner made calculations of distances and rates, and averages of the same, which, according to his conclusion, showed that Duluth has an undue advantage in the territory in question; also that what Mason City proposed would give it an advantage over Duluth, although the average distance slightly favored Duluth. He drove a line between the two and suggested the issuance of an order by the Commission as herein set forth—*Traffic World.*

Another new enterprise in the sand and gravel industry is the Eaton-Kaster Gravel Company, recently incorporated at Indianapolis, Ind. They have capitalized at $12,000, and the directors are Arthur E. Eaton, Robert C. Kaster and William H. Tudor.

Standard Sand & Gravel Company, Inc., Lillington, N. C., is a new company, with a capitalization of $500,000.

Stripping Overburden From Fullers Earth

FULLERS earth—a porous silicate of aluminum—is a clay which was originally used in England for fulling cloth, but it has grown to be one of our most valuable minerals, being particularly adapted to the bleaching and refining of vegetable, animal, mineral and lubricating oils; and the refining of mineral and lubricating oil is one of the fastest growing industries in the world today.

Florida is the chief producer of fullers earth, shipping perhaps 80 per cent of the entire United States production. The Florida deposits are in Gadsden County, northern Florida, and in Manitee County, southern Florida. The northern deposits contain the highest grade clays which are particularly adapted to the bleaching and refining of mineral or lubricating oils, and are in increasing demand for such use.

In this district are two large operations; the Floridin Company of Warren, Pennsylvania, with mines and mills at Quincy and at Jamison, Florida; and the Fullers Earth Company of Cleveland, Ohio, with mines at Midway, Florida. The mines and mills of the Floridin Company in Gadsden County, Florida, are the largest operations in the state, and in fact in the world at the present time.

The process of preparing fullers earth for the market is a simple one, but expensive on account of the overburden of soil, sand and pipe clay which must be removed before the vein of fullers earth can be reached. A still greater item of cost is the removal of the immense amount of water contained in the fullers earth after it comes from the pit. This water content is usually 50 per cent of the weight of good clay.

The virtue and commercial value of the clay is largely governed by its porosity. A cubic foot from the pit will weigh 60 to 70 pounds and when crushed and dried out will weigh only 30 to 35 pounds.

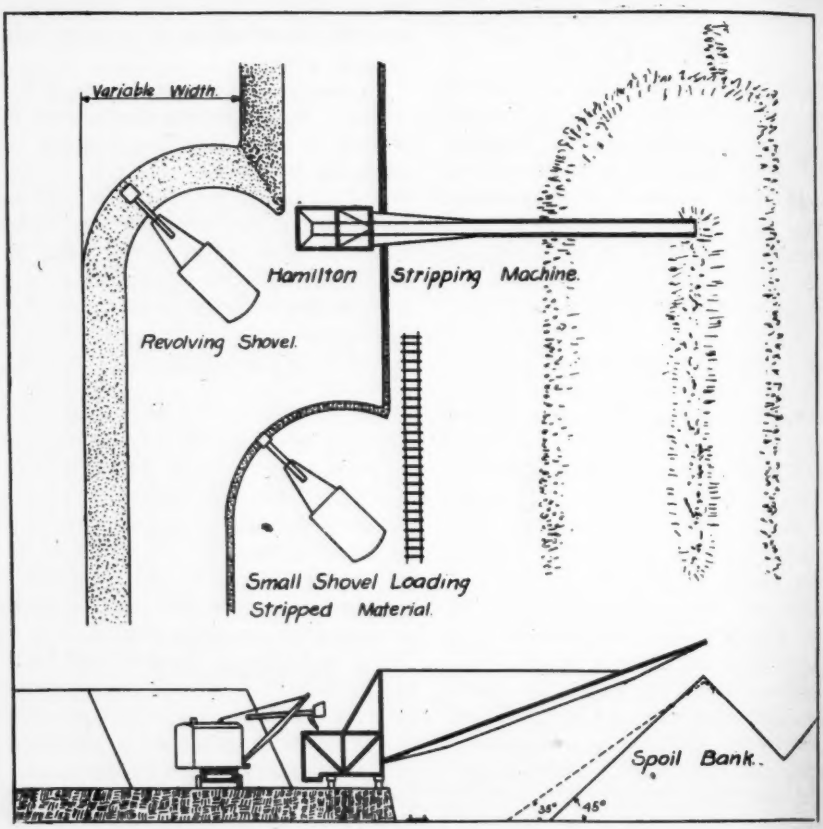
To remove the overburden from the stratum of the fullers earth, and to remove it to a sufficient distance to allow the recovery of the vein, is the first problem in this field, as well as in many other fields where sedimentary veins are worked. Owing to the great difficulty of handling this sticky overburden on an unstable clay for laying tracks and shovels, several systems and plans have been tried out in this district.

The method of hauling the overburden away by locomotives and trains of dump cars to spoil dumps is the usual plan, but the advent of a new device and system recently successfully installed by the Floridin Company at its plant at Quincy materially reduces the labor, equipment and time required to accomplish the same result.

The equipment is designed and built by the Hamilton Manufacturing Company of Columbus, Ohio, and consists of a portable stripping machine moving by its own power and working in conjunction with any ordinary steam shovel. By the Hamilton machine and system the overburden is removed by another shovel, and as the work proceeds, the overburden from the next cut is wasted into the space from which the vein of clay has been removed.

This portable stripping machine has a hopper located to receive the discharge from the shovel dipper at the most advantageous height and angle; and as the machine moves with its own power, it is independent of the shovel, but at the same time it is its constant attendant, and always ready to receive and dispose of all the shovel can give it.

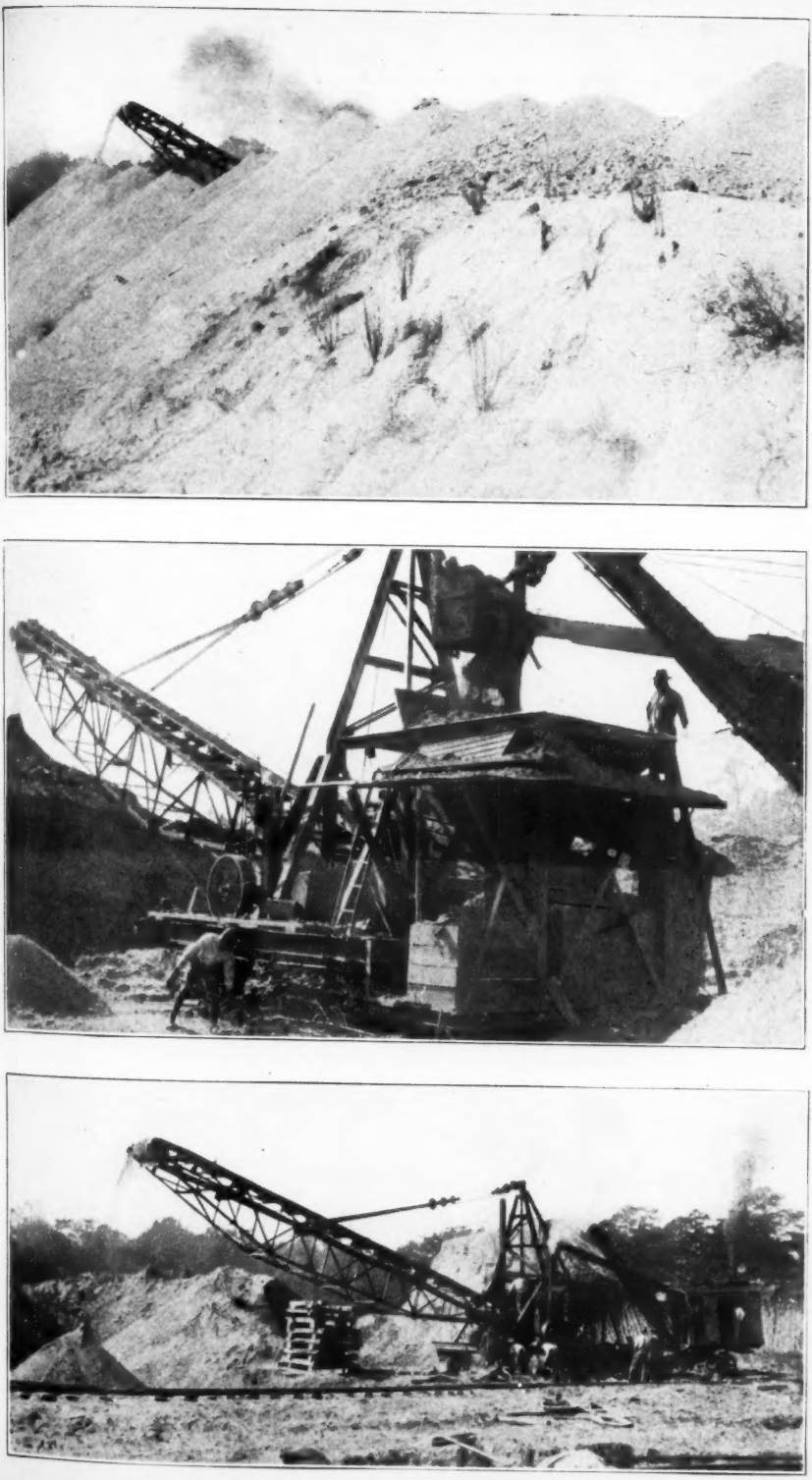
This ever readiness to take all the shovel can give it, increases the capacity of the shovel, and entirely eliminates the delays heretofore incident to waiting for cars to return from the



dump pile, for temporary tracks to be laid and cars spotted thereon, and thereby the shovel's capacity is augmented some 50 per cent over its average yardage when forced to wait on the spotting of dump cars, etc., and trains traveling back and forth.

In the accompanying line drawing and photographs it will be seen that the location of the hopper on the machine reduces the swing of the shovel one-fourth as compared with the swing necessary to dump into a car. The large opening of the hopper and its fixed height and position with reference to the shovel, makes the work of the shovel runner more easy, regular and sure. This machine does not have to be moved up every time 6 yards are put into it. The shovel man learns the position of the hopper on the first swing of his dipper and does not have to "feel" for it every swing, as is the case when filling dump cars where spilling on the track is likely to derail the train.

As the work of all shovels divides itself into 20 per cent digging time and 80 per cent swinging and dumping time, if we reduce this swinging and dumping time 25 per cent, we increase the shovel's efficiency 25 per cent; and in dispensing with the use of dump cars and dinkey locomotives, and the large gangs of laborers required to lay and shift tracks, all this expense is eliminated with the inevitable delays in waiting, spotting and dumping cars, track shifting. This means another 25 to 50 per cent of shovel time saved.



Stripping a Fuller's earth deposit.

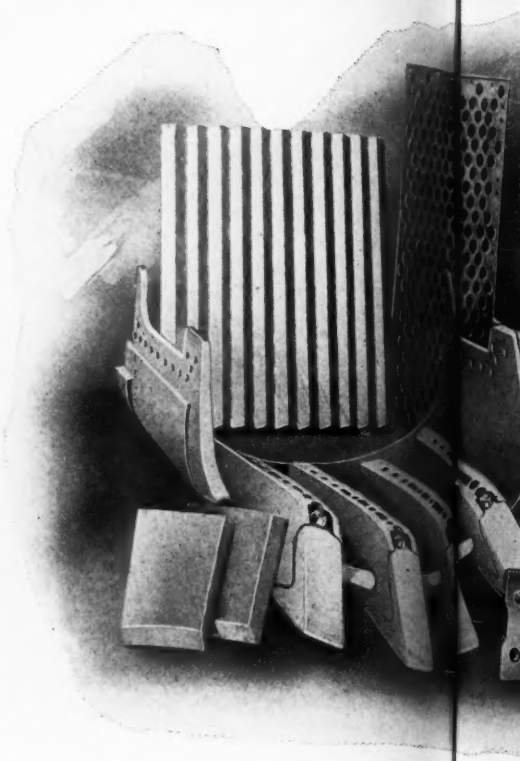
TISCO MANGA

The producer

of stone, sand, gravel knows that the urgent work of the coming season will not admit of delays. He will have to be in a position of security if he hopes to meet the demand for aggregates for roads, buildings and other classes of construction. This year is expected to bring a harvest to producers of these three widely used materials, and those who will get ready for the rush will reap the benefits.

How Prepare?

Can it be done by using odds and ends you may pick up from time to time as needed? Emphatically "No"! That is a makeshift method, unworthy of a good business man. Only by preparing your plants to last the longest possible time, enabling them to take care of orders promptly as they come in, can you cash in on a heyday of business to the fullest extent. You may think you have new machinery that will certainly take care of you against others who have repaired older equipment, but that is a "yes" and "no" proposition. Yes—if you specified on your order that the wearing parts of your various new equipment be furnished of TISCO Manganese Steel; No—if you have specified other wearing materials.



In the illustration is shown a steam shovel dipper reversible dipper teeth for a 2½-yard s. Similar steam shovel parts of manganese are ade for any dippers. The manganese crusher pa wn include crusher head, concaves or staves, and ers for rota

We
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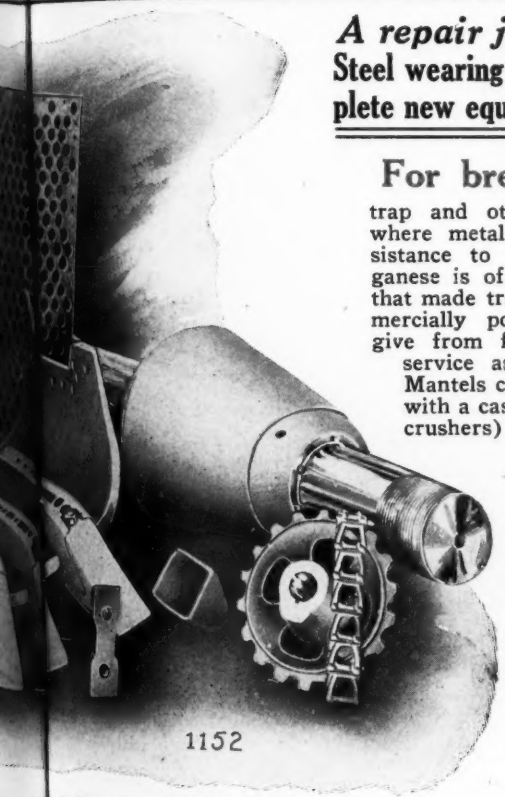
TAYLOR-WHARTON IRO & S

GANESE STEEL



wn a steel dipper front equipped with Panama 2½-yard ... Similar fronts and teeth with other ese are made for any and all makes and types of usher parts in include a jaw plate, screen plate, ves, and ... for rotary pulverizer.

A repair job **with TISCO Manganese Steel wearing parts is better than a complete new equipment with other materials.**

For breaking granite

trap and other very hard and tough rock where metal of toughness, strength and resistance to wear is required, TISCO Manganese is of first importance. It is the steel that made trap and granite rock crushing commercially possible. TISCO Manganese will give from four to six times the length of service as the same part in chilled iron. Mantels can be made smooth or corrugated, with a cast iron center (or solid, if for small crushers) and of any design the customer desires. Jaw plates for some crushers are carried in stock, others made up upon receipt of customer's orders.

Screen plates made of TISCO Manganese have many advantages. They wear many times longer than punched plates, due to their holes tapering from a given diameter on the inside to a larger one on the outside, by which means the screen is kept clean of stone and the holes do not tend to elongate.

Preparation for this coming busy season should include the policy of ordering manganese steel wearing parts for parts subjected to excessive wear and hard usage. If you adopt this policy, you will avoid shutdowns due to breakage or worn parts, keep the plant running, and turn out the dollars.

We Can Take Care of You

TISCO has provided ways and means of taking care of the increased demand for all kinds of wearing parts for crushing machinery, screens, conveyor chain, sprockets and buckets; lips, fronts, Panama reversible dipper teeth, etc., for steam shovels; hammers for pulverizers of any standard make.

RON & STEEL COMPANY HIGH BRIDGE, NEW JERSEY

Fig. 1—Small washing and crushing plant.

Fig. 2—Chute feeding crusher.

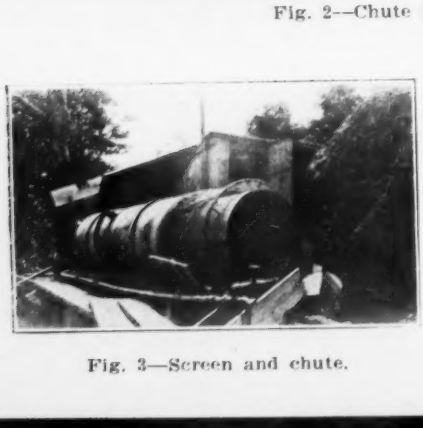


Fig. 3—Screen and chute.

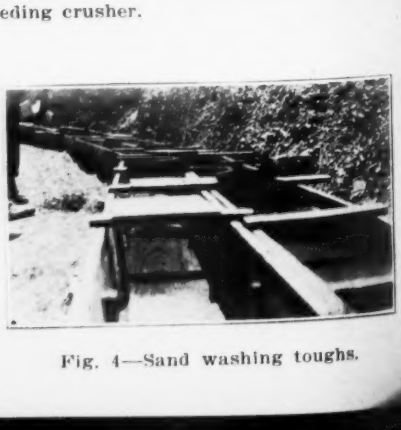


Fig. 4—Sand washing toughs.

A Small Unit for Washing Sand and Gravel, Also Crushing

A SMALL operation in the sand and gravel business, if it has some labor-saving features and is well managed, may prove as interesting to operators as some larger plants. This proved to be the case with a 50-ton per day plant owned and operated at Connellsville, Pa., by Mr. F. F. Zanchi, who not only assembled the plant but designed and built his grading and washing plant.

The operation is a new one, having been installed this last spring, but the plant has been working to its full capacity and has found a ready sale for its product. The quality of the gravel and sand is excellent as it is well washed, nicely broken and well graded.

Fig. 1 shows the entire washing and crushing plant with the gravel bank in the distance. The crushing plant is simple and of the portable type used principally by contractors. The crusher is a No. 4 Champion, and the screens and bins are also of the Champion type. These have all been taken from the wheels and placed upon sills. The space under the bins has been boarded up and a concrete floor put in. Here a fifteen horsepower Westinghouse motor has been housed to operate the crusher, elevator and screens. In the same room, tools and supplies are kept and the owner has a small desk for making out his bills and writing letters—a practical saving of space and office rent. As will be seen from the photograph, as the bins are filled and not used, the crushed gravel is run into stock piles on the ground.

In Fig. 2 is shown the chute that feeds the crusher, with the washing screen in the background. The gravel produced at this plant is graded from ¼-inch up to ½-inch, from that size to 1¼-inch and then 1½-inch.

At present the gravel and sand in the bank is excavated by hand with pick and shovel and loaded into wheelbarrows. The distance for wheeling now is less than 25 feet. Plans are being made to put in small cars later, and a motor, as the grade will be with the loads, the plan being to develop this property into a pit. A by-chute at the end of the washing screen allows very large gravel and boulders to be shot down into the chute shown in Fig. 2, and fed directly into the crusher.

The rest of the material is dumped into the chute shown in Fig 3, all of it entering the screen. It will be noticed that this screen is covered with sheet steel, all except the last section, and this has wire netting on it to catch some of the dirt from the sand. It will be seen that this screen is placed on a very slight incline. At the end of the first section a wooden bulkhead is fastened in the screen, this allowing all the gravel of 1¼-inch or smaller to pass the bulkhead and be washed and graded by the screen, the sand and loam also passing. Everything larger than 1¼ inches is held in the screen until it is rejected and comes out at the same end it entered, falling into the chute shown in Fig. 2 and thus being carried to the crusher, which breaks it up, grading it to three sizes. That passed through the washing screen is graded to two sizes only.

From the screen the loam and sand enter a trough. This trough leads into twin troughs shown in Fig. 4. A gate at an angle allows either of these troughs to be shut off while the other one is being filled. The trough shown in Fig. 4 is in operation, being filled with sand and water. The sand is held

by means of the small doors shown on top of the trough on the left. The loam floats over the top of these removable doors and is carried off by the overflow of water into a trough at the end of the twin troughs. When one trough is full, as shown in the photograph, the loam and sand are turned into the other trough. Then the end gate of the full trough is shut off and a side gate discharging into a trough that carries the sand to the storage pile is opened. The water again being turned on and the gates taken out, the operation is reversed. This means a continuous process of washing sand and at a small cost, the sand being remarkably clean.

The washing screen is operated by a 2 horsepower Crocker-Wheeler motor. Water pipes are run to the screens, and to the various troughs and chutes, keeping a good supply of clean water. This is obtained from a nearby stream by means of a 2-inch Harris centrifugal pump direct connected to a General Electric 3 horsepower motor.

As the pit is developed the operator expects to install a second unit, and will be able to ship both sand and gravel by rail, as there is a railroad siding within a thousand feet of the plant.

Potash Beds of France May Revert to Government

The riches represented by the potash beds of Alsace and Lorraine which, added to similar beds in Saxony, gave Germany in pre-war days a virtual monopoly of the world's potash market, may be controlled entirely in the future by the French Government. With the regaining of her "lost provinces" most of these immensely valuable deposits were taken under state control, but a certain portion were operated prior to the war, by French and neutral capital, and so failed to revert to France under the terms of the treaty of Versailles.

Reliable information received at the American Red Cross headquarters in Paris states that a bill will shortly be introduced into the French Chamber of Deputies authorizing the purchase by the State of the remaining portions of these beds.

Although Germany still retains the Saxony deposits, by far the greatest wealth exists in those of Alsace and Lorraine, so that France may be said to be the potential fertilizer king of the world.

First Shot at New Plant

Opening Blast at Luckey Tears Down 8,000 Tons of Stone

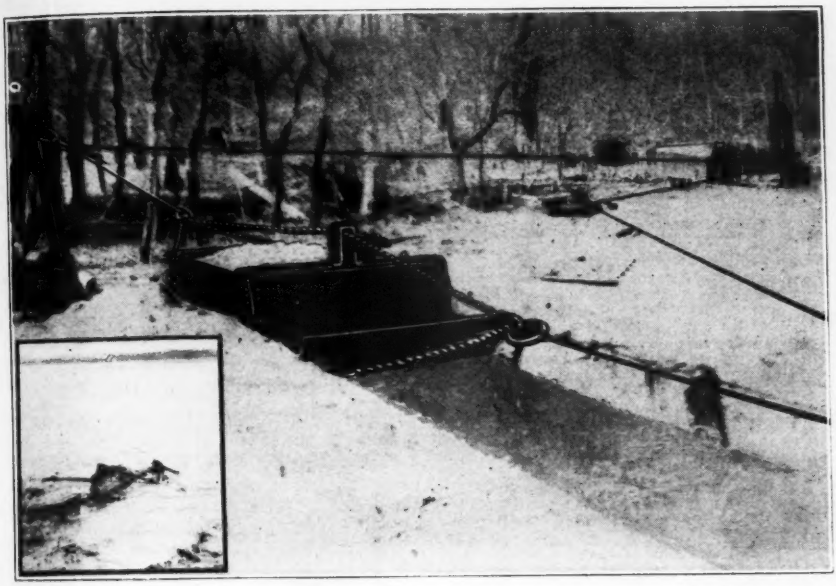
ON JULY 20th the initial shot was made, opening the new quarry of the Luckey Lime & Supply Co., Luckey, Ohio.

This new development has aroused considerable interest because of the extent of the proposition, as well as on account of some unusual features in design and construction by the contractors and engineers, Arnold and Weigel, Woodville, Ohio.

The tracks from the crushing plant to the quarry have already been installed, and the quarry was opened up with a straight face of over 100 feet at right angles to the tracks.

For the purpose of making the blast, 89 holes of 4⅝-inch diameter were drilled with a Clipper well drill. These holes were spaced 8 feet apart in both directions and staggered. Each hole was loaded with approximately 60 pounds of 60 per cent gelatine dynamite, making in all about 5,340 pounds.

The shot was made by Mr. Russell of the Du Pont company and was considered to be one of the most successful ever put off. The amount of stone thrown down was estimated at 8,000 tons at an approximate cost of 17 cents per ton.



Taking out gravel at Huntington, Long Island

This Gravel Is a By-Product

In making plans for deepening their water frontage, the property owners of Lloyd's Neck at Huntington, Long Island, found that most of the material excavated would be sand and gravel of suitable quality to meet the specifications for some of the road improvement work now under way in that vicinity.

Accordingly a company known as the Suffolk Gravel Co. has been organized to sell this sand and gravel, and as the local demand for material is brisk, the indications are that a good part of the cost of deepening the harbor will be defrayed in this way.

A ¾-yard Sauerman bottomless power scraper is being used for the work. The views show the scraper when operations first commenced, the material it is handling being a heavy mud and vegetable muck that overlaid the sand and gravel bank. The small illustration shows the loaded scraper coming out of the sea, with Lloyd's Harbor in the back-ground. The large illustration gives a good idea of the shore and of the installation, showing the 9x10 double cylinder double-drum steam hoisting engine that operates the scraper, and the location of the A-frame and the anchorage post carrying the guide blocks for the load and pull-back cables which drag the scraper back and forth. The outboard end of the pullback cable runs through another guide block attached to an anchorage several hundred feet out in the harbor.

The Robins Portland Cement Company on June 15 filed certificate of incorporation with the secretary of state of Delaware. Their authorized capital is $2,000,000, par value $10.00. Its incorporators are T. L. Croteau, M. A. Bruce and S. E. Dill, all of Wilmington, Del. Their Delaware agent is the Corporation Trust Company of America, DuPont building, Wilmington.

On June 25 there was incorporated under the laws of the state of Delaware another new company in the crushed rock industry, the North Texas Rock Company, whose capital stock is authorized at $1,000,000. The interested parties are L. L. Donnell, W. W. Hyde and B. R. Jones, all residing at Fort Worth, Texas. Their Delaware agent is Colonial Charter Co., 927 Market St., Wilmington, Del.

Wahl Dewaterer

A new dewatering machine is being placed on the market by H. R. Wahl & Company, First National Bank Building, Chicago, Ill. It is known as the Wahl dewaterer, and has been offered as a complete departure from the usual methods of dewatering granular solids. Among other advantages, the following are listed in the new catalog which the company is sending out:

Operating without any scraping action, it does not create slimes, nor wear itself out.

The solids are lifted bodily out of the water and drained in successive independent stages without contamination at any point. A greater latitude in size of material is handled (from slimes to 1 inch rock or larger).

It has a greater settling capacity, dewaters a greater tonnage and occupies less floor space.

It requires very little mill height (from one to two feet). Very little power is required and the maintenance expense and erection cost are exceptionally low.

The quantity of water discharged with the solids can be varied and closely regulated to suit the requirements.

It is simple and entirely self-contained.

It can be furnished in a modified form to permit of hydraulic classification with agitation to prevent settling of fine sands or slimes when it is desirable to include these in the overflow. It can also be furnished with a feed elevating wheel when it is desirable to gain mill height or reduce head room.

The customary model of this machine consists mainly of a deep, narrow water tank, containing a primary settling chamber within its upper central portion, having a feed inlet through at one side.

A supplemental elongated settling tank of V-shaped section joins the main tank at right angles to its side and receives the overflow from the primary settling chamber through a narrow slotted opening in the upper part of their partition wall. The opposite end of the supplemental tank is provided with an overflow weir, which maintains a water level in both tanks.

Partly submerged within the main tank and supported on two pairs of rollers is a narrow-faced open-end cylinder or rotor, of U-shaped cross section, equipped with tires upon which it rotates, encircling the primary settling chamber. The rotor received on the lower portion of its inner periphery the solids which have settled through the bottom outlet of the chamber.

Following the interior periphery of the rotor, a number of buckets are pivotally supported between its side plates, with sufficient clearance at both sides and end to allow the buckets to swing freely within proper limits, determined by adjustable stops at the bearings located on the outside of the rotor.

When in operation, both rotor and buckets revolve together about the settling chamber, and thereby elevate, dewater and discharge the solids from the machine without attrition.

A copy of the catalogue will be sent on application, showing illustrations of this and other models of this machine.

For Storage Tanks

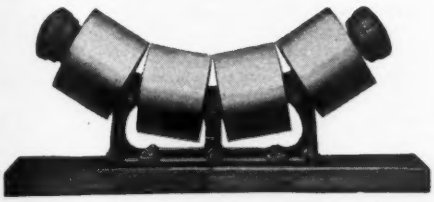
The illustration herewith shows a type of tank and silo construction designed by the J. M. Preston Company, Lansing, Mich. This construction will be of particular interest to readers of PIT AND QUARRY at the present time, because of the increased demand for tanks for the storage of agricultural lime and other pit and quarry products, occasioned by the irregularity of car service.

The design includes vitrified clay blocks with double air space, designed in such a way as to provide for heavy mortar joints in which reinforcing rods are embedded. These blocks are 15x15 in. face measurement and are 6 inches in thickness.

The finished block requires 47 pounds pressure to the square inch to force liquid through walls. All blocks are salt glazed, which adds to the beauty and moisture proof qualities. Under the severe test of boiling for five hours Preston-Lansing vitrified tile blocks only absorbed an average of 5.5 per cent, and when tested by being immersed for 48 hours they absorbed an average of only 1.5 per cent.

Actual tests made by state engineering departments show that each Preston-Lansing vitrified tile block is capable of supporting a load of from 150,000 to 250,000 pounds.

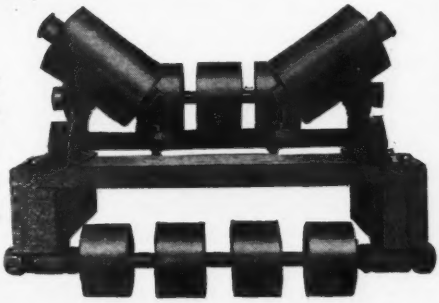
CALDWELL CONVEYORS

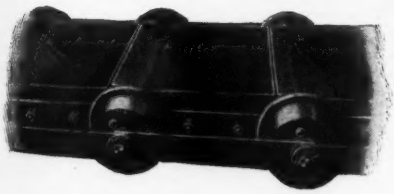


BELT CONVEYORS

Simple in design, economical of power, they give satisfaction. Different styles to suit your requirements.

A rough sketch showing conditions to be met at your plant, with capacity desired and power available, will bring our recommendations.





APRON OR PAN CONVEYORS

Flights or pans made of steel or cast iron, fitted to steel bushed self-oiling roller chain — complete with drives.

SCREW CONVEYORS

Steel "HELICOID" or Sectional flight screw conveyor for washing plants. We also make cast iron Screw Conveyors.

See Catalogue No. 38 for complete line of

Elevating, Conveying and Power Transmitting Machinery

H. W. CALDWELL & SON COMPANY
CHICAGO
Western Avenue, 17th and 18th Streets

Booklet on Belt Joining

Among the recent bulletins and booklets on better belt service issued by the service department of the Crescent Belt Fastener Company, there is one publication which will be of particular interest to all readers who have belts in their plants.

Both the man who buys belting today and the man who has an investment in belting have a commodity which can only be replaced with delay, difficulty and considerable expense, and the continuous performance of which is absolutely essential for maintenance of production schedules and operating at minimum low cost.

One of the biggest problems the belt user has to face is that of joining the belt in a way which preserves its strength and insures its longest and most satisfactory service.

Obviously, no belt can give better service than its joint will permit, and if destructive methods are employed which punch out valuable belting material or weaken the lengthwise, power-carrying belt fibres, the service and the life of the belt are impaired.

This new Crescent circular entitled "Modern Scientific Methods in Belt Joining" contains practical belt-joining data for the practical belt-joining man. This information is of permanent value to anyone interested in belt upkeep and it is so designed, that when opened up and tacked to a wall, it presents on one page full information for joining the belt to insure its best service under all conditions of work.

The instructions as to how to make belt joints which retain the belt's full strength and assure its longest life are given in simple and concise language and are amply illustrated. The larger illustrations show in full size the outside and pulley side of Crescent joints. A cross section illustration shows how a belt can be joined without weakening it in any way, and is a vivid demonstration of how the Crescent method retains the full strength of the belt and actually reinforces it. It also shows how the Crescent method avoids metal coming in contact with the pulley and thereby eliminates noise, wear and crystallization.

Copies of this illustrated circular will be sent to any of the readers of this publication to whom it may be of interest, by addressing Quarry Products, Service Dept., of Crescent Belt Fastener Company, 381 Fourth Avenue, New York.

Recent Patents

The following patents of interest to readers of this journal recently were issued from the United States Patent Office. Copies thereof may be obtained from R. E. Burnham, patent and trade-mark attorney, Continental Trust Building, Washington, D. C., at the rate of 20 cents each. State number of patent and name of inventor when ordering.

1,343,292. Non-cloggable self-cleaning screen. Alonzo G. Turner, Hanksville, Utah.

1,344,201. Mining-machine. Charles E. Davis, Chicago, Ill., assignor to Goodman Mfg. Co., same place.

1,344,584. Gyratory crushing-mill. William W. Gibson, San Francisco, Cal.

1,344,747. Shaking-screen. Charles V. Wright, Reynolds, Pa.

1,344,751. Shaker-screen. Earl E. Berry, Kennet Square, Pa., assignor to American Road Machinery Co., same place.

1,344,969. Excavating-bucket. William M. Venable, Pittsburgh, Pa., assignor to Blaw-Knox Co.

1,345,074. Automatic mine-door-operating mechanism. William Crooks, Aldrich, Ala.

1,345,296. Excavator. James J. Warren, Seattle, Wash.

1,345,453. Coal-separator, William M. MacFarlane, Scranton, Pa.

1,345,715. Crushing-machine. William G. Stevenson, Chicago, Ill.

1,345,991. Power mine-shovel. Patrick B. Brown, Shenandoah, Pa.

1,346,238. Sand-drying plant. Henry W. Nagel, Chicago, Ill.

1,346,390. Apparatus for gathering and conveying material. Francis L. Stuart, New York, N. Y.

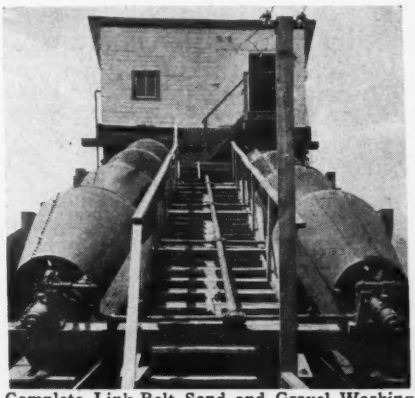
1,346,460. Sand-loading device. George Michna, Albany, N. Y.

New Belting Company

Mr. Chas. H. Denkenemeyer, for nineteen years with the Gandy Belting Co., has withdrawn from that organization and has organized the Republic Belting Company, Inc.

This new concern has acquired a tract of land at Smallwood, Pratt and McHenry streets, Baltimore, and has placed the construction of the plant in the charge of Mr. Huldreich Egli, a thoroughly competent engineer, who has done some very good industrial designing in that part of the country.

Dull Inclined Conical Screens



Complete Link-Belt Sand and Gravel Washing Plant

LINK-BELT

Sand and Gravel Plants

We design, equip and supervise the construction of complete sand and gravel washing plants or alterations to present plants.

The fact that over seventy-five per cent of such plants in America are Link-Belt and Dull designed is proof of the high efficiency and successful operation of our plants.

Our engineers are specialists in this field. Our equipment is of the highest grade and represents positively the last word in design and efficiency.

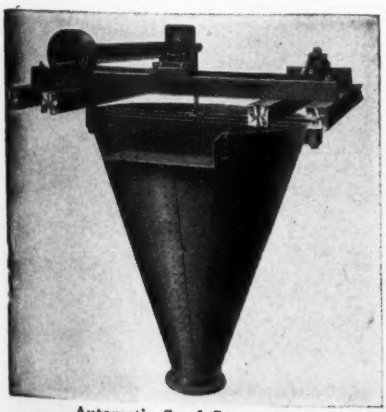
Write for our catalogue No. 213A.

Let our engineers help you

LINK-BELT COMPANY

PHILADELPHIA CHICAGO INDIANAPOLIS

Offices in All Principal Cities



Automatic Sand Separator

Cable Way Excavator Bucket

Traylor Superpump

The Traylor Engineering and Manufacturing Company of Allentown, Pa., has recently issued Bulletin 101, entitled "The Superpump and Hydraulic Machinery."

The purpose of the bulletin is to give to pump users a comprehensive idea of the structural details of the Traylor superpump, and these are gone into with minuteness both in description and illustration. It is not possible to go into these here, but only to give some of the general possibilities back of the superpump design. Regarding these, the bulletin says:

"That the power-driven pump is the most efficient and most economical machine for the handling of liquids is an incontestable fact. This is true for the reason that the stroke is a fixed and known quantity thereby yielding a measured displacement for each revolution. A further reason is that a much higher piston speed may be had with a crank pump than with a direct-acting steam pump.

"It is, however, no simple matter to build an efficient power pump, due to the fact that problems are presented which are not met with in the design of a direct-acting steam pump. The chief of these are:

"First: The piston speed of a plunger pump varies throughout the stroke, inasmuch as the crank describes a circle while the plunger moves in a straight line. It will thus be seen that the velocity of the plunger increases from zero to maximum and then decreases from maximum to zero.

"Second: Water is practically incompressible and therefore the velocity of the discharge is at all times in direct proportion to the speed of the plunger.

"Consideration of these points will show that the pump chambers and the pipe line are subject to shocks or pulsations depending in severity upon the speed and pressure. This does not occur in steam pumps. As a consequence, simplex and duplex power pumps have little advantage over direct-acting steam pumps, notwithstanding the wastefulness and low efficiency of the latter.

"It is clear, then, that the solution lies in the multiplication of plungers, and when three or five are used, the power pump rises superior in efficiency and economy. The reason is, of course, that the cranks being set equal distances apart (120 degrees in the triplex or three plunger, and 72 degrees in the quintuplex or five plunger), the pulsations overlap, so that the discharge from the pump chambers is nearly uniform in quantity and pressure.

"The Super-pump is a machine of simple and sturdy ruggedness. The design is heavy, the use of metal lavish—to minimize vibration and forestall fracture. The water passages are large and free from angles—valves are ample in area and bearing pressures are low."

New Publication

Portable Machinery Co., Passaic, N. J., has just published a 24-page catalog entitled, "Portable Conveyors." This is complete with illustrations showing the various uses of the scoop conveyor and other portable conveyors manufactured by them, and describes clearly the labor, time and money saving features of these machines in storing, reclaiming, loading and unloading material such as coal, coke, ashes, sand, gravel, crushed stone, fertiltzer, cement, chemical, etc.

Copies of the catalog will be sent free upon request to the manufacturers at the address given above.

Dump Bodies

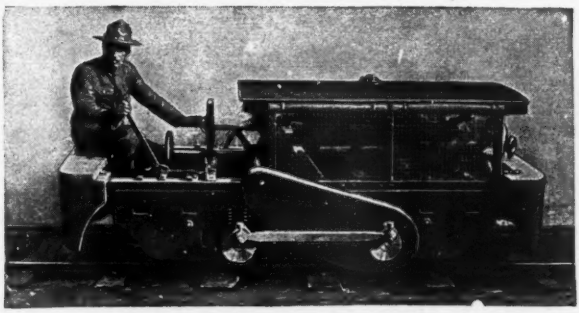
A valuable bulletin has recently been issued by the Heil Co., Milwaukee, Wis., showing the various types of dump bodies and other motor truck accessories manufactured by this company. It is full of suggestions for the users of motor trucks.

In writing for it ask for bulletin 113.

Use Ground Limestone

That underground limestone does pay and pay well is the opinion of Mr. Cogwill Blair of Jasper County, Missouri, as set forth in the following statement: "My soil was found to be sour and I applied two tons of ground limestone per acre for alfalfa. I got fine results. The limed land produced 4,088 pounds of alfalfa per acre, while the unlimed produced only 1,292 pounds."

The Curwensville Sand & Stone Co., Edensburg, Pa., is a new $200,000 incorporation.



Just the thing for Your Plant!

The Bell Gasoline Locomotive

Note What a U. S. Motor Transport Officer Says of It:

File No. 451.3

OFFICE OF THE QUARTERMASTER
FORT WOOD
New York Harbor

October 28, 1919.

To: Bell Locomotive Works, Inc.,
23 Water Street, New York.

Subject: Narrow Gauge Locomotive.

1. In reference to your inquiry, this office wishes to advise that the service rendered by the special narrow gauge locomotive built by your firm for this Post has been entirely satisfactory.

2. This machine was built by your firm on a rush order and it has proven itself worthy in simplicity and dependability of operation.

3. There has never been an engineer assigned to the operation of this machine, anyone who happened to be available having been assigned to run it. Even under these circumstances, the engine has given maximum service.

(Signed) Christian Wahl,
Major Signal Corps,
Acting Motor Transport Officer.

In your pit or quarry, you will find an outfit like this, run on narrow gauge rails, a means of greatly speeding up the production and delivery of your entire plant. These locomotives are of the internal combustion, friction-driven type, and made in 2, 3 and 4-ton sizes for any gauge 18 inches or over.

Write for literature, stating requirements.

BELL LOCOMOTIVE WORKS, Inc.

23 Water Street **NEW YORK**

Send for bulletin 134 covering our oil burning steam locomotives.

Steam Shovels

Special attention is called to the following thoroughly overhauled shovels.

1—Model 0 Thew, shop number 1084.

2—Marion 60 Steam Shovels with 2½ yard dipper, Shop Nos. 1995 and 2059.

1—Type "B" Erie, ¾-yard, full revolving, on traction wheels.

LOCOMOTIVES

1—10x16-in., 20-ton, standard gauge Baldwin Locomotive.

6—18 ton, 10x16, H. K. Porter Dinkeys, 36" gauge.

CARS

30—12 yard capacity Western, standard gauge air dump cars, 26' beds.

90—20-yard capacity standard gauge Magor air-dump cars. These are new cars, built for U. S. Government, steel construction throughout, with wood floors.

67—12-yard capacity standard gauge Western Wheeled Scraper Company's cars. These are new cars built for U. S. Government, latest type construction.

In addition to the above, we have a large stock of contractors' construction equipment of various classes.

H. Kleinhans Company Union Arcade, Pittsburgh, Pa.

EFFICIENCY

RELIABILITY

READING

CO-OPERATION

Your Inquiries Solicited

SERVICE

Estimates Given Cheerfully

New — Used — Rebuilt Machinery and Supplies FOR Construction and Industrial Work

Crushers

1—No. 9 Allis-Chalmers Gyratory
1—No. 8 Austin gyratory
1—No. 7½ Austin gyratory
2—No. 6 Gates gyratory
1—No. 6 Kennedy gyratory
1—No. 5 Kennedy gyratory
1—No. 4 Austin gyratory
2—No. 3 McCully gyratory
1—No. 2 Austin gyratory
1—48x60 Traylor jaw
1—30x60 Traylor jaw
1—15x24 P. & M. jaw
1—13x30 Farrell jaw
1—10x20 Farrell jaw
1—12x22 Acme jaw
2—9x16 Climax jaw
1—9x16 Reliance jaw
1—9x15 Cedar Rapids jaw
1—7x12 Reliance jaw

SCREENS—Assorted Sizing, Scalping and for sand.
ELEVATORS—Assorted lengths, capacity 25 to 250 tons per hour.

Steam Shovels

1—Erie, type "B," ¾ yd. dipper, traction, full revolving.
1—Model 28 Marion, ¾ yd. dipper, 30' crane boom for clam shell bucket operation, traction, full revolving.
1—Bucyrus, 18-B, ⅞ yd. dipper, only used nine months on light work, traction, full revolving.
1—Marion, Model 20, Shop No. 922, 1 cu. yd. dipper on standard gauge railway trucks.
1—Marion, Model 40, Shop No. 1865, 1½ cu. yd. dipper on standard gauge railway trucks.
1—Bucyrus, 70-C, Shop No. 1685, 2½ cu. yd. dipper on standard gauge railway trucks.
1—Boom for Model 60 Marion, 35' long, 24' dipper stick and 1¾ yd. dipper, slightly used.
1—Dipper, 1¼ cu. yd. for Thew Shovel.

Locomotives

1—Plymouth, 3-ton, gasoline, 24" gauge.
1—Baldwin, consolidation, type 2-8-0, 8 drivers 44" centers, 20"x24" cyls., 107,000 lbs. on drivers; 8 wheel tender; 9½" air pump; tractive force 22,000 lbs. Now working, will be released shortly from lease.
1—Pittsburgh, Saddle tank, 4-38" drivers, 14"x24" cyls., steam brakes, standard gauge.
3—Porter, Saddle tank, 4 wheel; 9"x14" cyls., 36" gauge.
1—Vulcan, Saddle tank, 4 wheel; 9"x14" cyls., 36" gauge.
2—Plymouth, 4 wheels, friction drive, 3 ton, 4 cyl. gasoline engines, 36" gauge.

Hoists

1—12½x15 Stroudsburg, double cylinder, double drum, built for dragline service, used one month.
1—90 H. P. Thomas, electric, double drum dragline hoist, two speeds on forward drum, used six months.
1—112 H. P. Vulcan, electric, double drum mine or haulage hoist.
1—200 H. P. Davis, steam, cone drum, mine hoist.

The above is a partial list of our plant, we also have a general line of equipment and probably what you need. Write us.

Reading Engineering Co., Inc.

Tribune Building New York, N. Y.

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Quarry Specialties
GUARANTEED

BUCKETS

1—1 yd. Orange Peel	$ 300
1—1-yd. Dragline, Page	300
2—1-yd. Concrete at $50 each	100
1—1½-yd. McMyler (new)	500
3—2-yd. Brown Hoist at $500 each	1,500

BOILERS

1—200 H.P. Scotch Marine	2,000
1— 30 H.P. Upright	200
1— 15 H.P. Upright	100
1— 60 H.P. Upright	800
1— 50 H.P. Upright	700
2— 60 H.P. Erie Economic at $750 each	1,500

CRUSHERS

1—No. 12 Gates Style K manganese fitted nickel steel shaft (almost new)	8,000
1—No. 7½ Austin Gyratory	2,500
2—20x24 Blake, each	2,000
1—No. 4 Gates Gyratory	1,000
1—10x20 Blake	750

COMPRESSORS

1—Rand Imperial Duplex, cap. 1,500 ft.	2,000
1—Ingersoll, 2-stage, air, belt drive, 600 ft.	1,000

DIPPER

1—2½-yd. Bucyrus	500
1—¾-yd. Browning with boom and engine (new)	750

DRILLS

8—Chicago Pneumatic Tool Co. 3¼ in. drills, each	100

DERRICKS

1—5-ton Stiff Leg with steel bull wheel	500
1—2-ton Stiff Leg	200

ENGINES

1—150 H.P. Atlas Automatic	$ 750
1—200 H.P. Allis-Chalmers Corliss	1,250
1— 20 H.P. Erie Center Crank	200
1— 70 H.P. Erie Center Crank	300
1— 15 H.P. Keystone Reversible	250
1—Westinghouse	250
1—150 H.P. Stillwell Bierce	150

HOISTING ENGINES

2—6¼x10 American Hoist and Derrick with boiler at $750 each	1,500
2—6x8 Contractors' Plant Co. S. C. S. D., at $200 each	400
1—8x12 Lidgerwood D. C. D. D.	500
1—12x14 Special Dragline, 90 H.P. (new)	1,500
1—9x10 D. C., 3-drum Cableway Engine	1,500

LOCOMOTIVES

1—Vulcan 36-in. gauge Saddle Tank	1,000
1—Porter Standard Gauge Saddle Tank, 14 tons	2,000

PUMPS

1—No. 5 Pulsometer	100
1—Wilson-Snyder Water Works, 3,000,000 gals. per day	1,500

ROLLERS

1—10-ton Steam Roller	1,000

SCREENS

1—42-in. by 14-ft. Screen complete	400
2—Stephens & Adamson at $150 each	300

SHOVELS

1—Model 28 Marion Traction, fine	4,700
1—Vulcan-Bucyrus Revolving Shovel, standard gauge, perfect	3,250
1—70 C. Bucyrus with standard, also stripping booms and dippers	11,000

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For Sale USED AND REBUILT For Rent
PIT AND QUARRY EQUIPMENT

STEAM SHOVELS

1—"O" Thew, 5/8-yd. dipper.
1—Model 20 Marion, R. R. wheels, 1¼-yd. rock dipper, suitable for quarry or tunnel work.
1—Model 31 Marion, 1-yd dipper.
1—Model 36 Marion, 2-yd Dipper, caterpillar traction.
1—New Type "B" Erie, shop No. about 1035. Never used. Equipped with ¾-yd. Williams Clam Shell Bucket, Boom 36 ft. No dipper for this machine. Additional equipment can be secured.
1—Model 28 Marion, ¾-yd. dipper.

CRUSHERS

1—No. 4 Champion, on skids.
1—No. 4½ Champion, on wheels.
1—No. 5 Champion, on wheels.
1—No. 2 Gates Gyratory.
1—No. 7½ Austin Gyratory.
2—No. 5 Austin Gyratory.

HOISTS—STEAM

1—6¼x8 D.C.D.D. Orr & S. Boiler.
1—8¼x10 3-D. Stroudsburg Boiler, brand new.
2—10x12 D.C.D.D. American-Skeleton.
2—7x8 D.C. Single Drum, American Swinging Engines.
1—7-12 3-Drum Mundy-Skeleton.

LOCOMOTIVES

1—6x10, 36-in. gage, Porter.
2—9x14, 36-in. gage, Porter.
5—10x16, 36-in. gage, Porter, Vulcan and Davenport.
3—11x16 36-in. gage, Porter, Vulcan and Davenport.

CARS

10—1 yd., "V" Shape, 36-in. gage.
10—1½ yd., "V" Shape, 36-in. gage.
30—4 yd., 36-in. gage Western.
10—12 yd. Standard gage Western.

CRUSHING PLANTS

1—No. 2 Climax, Elev., Screens, etc.
1—No. 4½ Champion, Elev. Screens, etc.
2—No. 10½ Acme, Elev., Screens, etc.

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WE BUY EQUIPMENT.—What have you for sale?

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STEAM SHOVELS

4—70-C Bucyrus, Shop Nos. 1160, 1203, 1331, 1712, 2½-yd. dippers.
1—65-ton Bucyrus, Shop No. 394, 2½-yd. dipper.

REVOLVING TRACTION SHOVELS

1—Model 31 Marion on Caterpillar, 1-yd. dipper, Shop No. 3850, good condition, immediate shipment.

DUMP CARS

50—12-yd. standard ga. Western Air Dump Cars.
148—New 20-yd. capacity all steel standard gauge Western Air Dump Cars. Latest type.
100—New 16-yd. capacity standard gauge Western Air Dump Cars; composite type, wood beds and all steel underframes.
15—16-yd. standard ga. Western Side Dump Cars.
22—4-yd. 36-in. gauge Continental Side Dump Cars.
40—4-yd. heavy duty Western 36-in. gauge Side Dump Cars.
2—Western 36-in. gauge Spreader Cars.
20—1½-yd., 24-in. gauge Western Dump Cars.

LOCOMOTIVES

1—Standard gauge, 10x16 Cylinder Porter, 4-wheel, saddle tank Locomotive; air brakes, automatic couplers; weight 19 tons.
1—Standard gauge, 13x18 cylinder American saddle tank Locomotive; air brakes, automatic couplers, side entrance cars, with rear fuel bunker; steam pressure 165 lb.; weight 36 tons; built new 1911.
5—36-in. gauge, 10x16 cylinder Porter, 18-ton, saddle tank Locomotive; Shop Nos. 5065, 5235, 5302, 5304, 5305, extended saddle tanks, wide fire boxes, steam brakes and most modern design and equipment.
10—36-in gauge, 10x16 Davenport, American and Vulcan saddle tank Locomotives.
1—7x12 cylinder, 24-in. gauge Davenport saddle tank Locomotive; weight 9 tons.

ROAD BUILDING EQUIPMENT

6—1½-yd. Western bottom Dump Wagons.

Clapp, Norstrom & Riley Equipment Co.
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FOR SALE

30 H. P. Burke Motor, 220 volt, 750 RPM, 25 cycle, 3 phase induction motor with starter and base and pulley.

100 H. P. Burke Motor, 200 or 440 volt, 750 RPM, 25 cycle, 3 phase, slip ring induction motor with starter, base, and pulley.

NICKEL PLATE GRAVEL COMPANY
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FOR SALE

1—Model 70-C Bucyrus Steam Shovel. Good as new.
1—Model 60 Marion Steam Shovel.
10,000 Narrow Gauge Ties.
Large quantity steel cable.
About a carload 12x12 Oak and Pine Timbers.
Located at Delaware, Ohio.
All of the above guaranteed in first-class condition. Write for prices.

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Standard Gauge Locomotives
1—30-ton, four-driver saddle-tank American.
1—40-ton, 17x24 in., four-wheel switcher.
1—50-ton, 18x24 in., six-wheel switcher.
2—18-ton, 10x16 in., 36-in. gauge Vulcans.
2—10-ton, 7x12 in., 36-in. gauge Vulcans.
1—10-ton, 36-in. gauge Shay geared.

Miscellaneous
1—Marion 76 steam shovel, No. 3503.
1—Monighan dragline, 120-ft. boom, 3½-yd. bucket.
1—Bucyrus dragline, 60-ft. boom, 2-yd. bucket.
13—16-yd. dump cars.
40—60,000-lb. capacity flat cars.
1—Western standard gauge spreader.
2—1-yd., Foote side-discharge concrete mixers.
50-lb. and 56-lb. rail, ties, 1½-yd. clamshell bucket, 10 H. P. and 45 H. P. upright boilers, railway equipment, etc.

Industrial Equipment Co.
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FOR SALE—EQUIPMENT

STEAM SHOVELS
1—Model 36 Marion Caterpillar steam shovel, 2-yard bucket, 28-ft. boom. Could be converted into a dragline machine.
1—Vulcan Little Giant traction shovel, 1¼ yd. dipper. Good condition.

LOCOMOTIVES
2—13"x18" American standard gauge saddle tank locomotives, steam pressure 165 lbs. First class condition.
1—20 ton Lima standard gauge saddle tank, 160 lbs steam pressure—cyl. 10"x16".
4—10"x16"—36" gauge saddle tank locomotives.

DUMP CARS
24—Western 36" gauge 4 yard two way side dump cars, steel underframe, wooden beds.
50—Western 36" gauge 4 yard two way side dump cars, steel underframe, steel lined.
16—12 yard Western standard gauge air brake and air dump cars.
Also have other equipment. What are your requirements? Wire or write.

THOS. J. DOLAN
76 W. Monroe St., Chicago, Ill.

FOR SALE

1—No. 10—2 stage Alburger centrifugal pump on sub base, can be either belted or motor driven.

1—24x12 Improved Blake type, Allis Chalmers jaw crusher.

Both in stock and condition guaranteed.

Machinery Warehouse Co., Inc.
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To settle estate—Trap Rock Quarry located Bridgeport, Ct., three miles from center, in busy city, on Berkshire Division of N. Y., N. H. & H. R. R. Also good road for auto delivery. First class condition and could be started at once.

THE IRON LEDGE CO.,
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13 end-dump cars, good condition, wooden, steel lined, capacity 25½ cu. ft., 30-in. gauge, 16-in. Whitney Roller Bearing Wheels, built by Sanford-Day Co.

RAMPUS STONE CO.,
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One 45 HP. Kerosene Oil Engine. New. Never used. Will be run to show customer.

OSTRANDER FIRE BRICK COMPANY,
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CONTRACTORS EQUIPMENT

AIR COMPRESSORS

7—Chicago Pneumatic Tool Co. Class N—SGLTM 10½x7¼x10 in., with gas engine and air receiver mounted on trucks. Practically new.

DERRICKS

1—Stiff Leg, boom 16-in. x 16-in. x 80-ft., mast 16-in. x 16-in. x 50-ft., bucket operating, like new.
5—Stiff Leg Derricks, boom 14-in. x 14-in. x 60-ft., mast 12-in. x 12-in. x 32-ft., sills and legs in proportion, Terry & Tench fittings, 2 arranged for clam shell, 3 for single line.
1—Stiff Leg, 40-ft. boom, capacity 3 or 4 tons.
2—Breast Derricks.

HOISTS

1—10x12 D. C., D. D. Lidgerwood, with banked levers, no boiler.
3—9½x12 D. C. 3 drum with boiler, 2 Lamberts and one National with attached swinger.
10—8¼x10 D. C., D. D. with boiler, American, Lambert, Lidgerwoods, Flory, Clyde or Mundy.
15—7x10 D. C., D. D. with boiler, American, Lidgerwood, Lambert, O. & S., Mundy, Clyde and Flory.

STEAM SHOVELS

2—Type O Thew, fully revolving, ⅝ yd. dipper, traction wheels.

EXCAVATORS AND BACKFILLERS

3—Keystone Excavators, steam engine, boilers, complete with skimmer scoops.
1—Buckeye Wheel Type Trenching Machine, No. 4, with gasoline engine, on caterpillar traction.

BUCKETS

1—Brand new 2½-yd. Butler dragline bucket.
1—1-yd. Hayward orange peel.
Several others of various makes and sizes.

WAGON LOADERS

5—Jeffrey Portable gasoline driven traction bucket wagon loader, like new.

CARS

15—34-in. gauge Koppel V-shaped, 1-yd. side dump cars.
35—36-in. gauge, 4-yd. Western side dump cars.
12—12-yd. standard gauge, side dump.

DRAG LINE

1—Insley Drag Line, new, 60 ft. boom, with 1½ yd. drag bucket; with 9x13 National engine, with boiler, like new.

These are only a few items of the equipment we own. If you do not find what you want, write or wire us your requirements.

We are in the market for used equipment of all kinds. Write us, giving full description and price.

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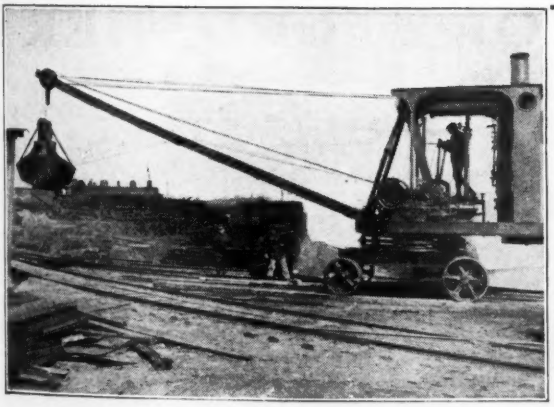

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Mounted on Traction Road Wheels. Equipped with 30-ft. Booms and ¾-yard Clamshell Buckets.

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CONTRACTORS' EQUIPMENT OF ALL KINDS

DREDGES—SAND AND GRAVEL MACHINERY

New Ready for Delivery

12" Morris extra heavy dredging pump arranged for electric drive.
3 drum Flory hoist directly connected to 10 H.P. motor, complete with control.
1½"—three stage Morris centrifugal priming and general service pump directly connected to 5 H.P. motor.

These three pieces comprise the essential equipment for a 12" electrically driven suction dredge. This equipment is of the latest design and of very rugged construction. The pieces have never left the manufacturer's shop and are now on the floor ready for immediate shipment. This is the only opportunity to get new equipment of this sort in less than five months delivery. Plans for hull and machinery arrangement can also be furnished.

USED EQUIPMENT

1—10" patented Morris manganese lined belt driven dredging pump suitable for pumping coal, sand, gravel or tailings.
1—12" extra heavy belt driven Morris sand pump.
1—Standard cutter ladder for 12" dredge complete with engine, gears, trunnions and A frame fittings.
1—Symons disc crusher No. 30.
1—8¼x12" single drum Mundy hoist with boiler.
1—single drum Flory electric hoist with 42"x38" drum.
2—2 yard Steubner bottom dump buckets.
1—8" suction dredge, hull 50'x21'x38", Morris dredging pump driven by Fairbanks Morse Oil Engine.

PIERCE J. McAULIFFE
17 Battery Place New York City

FOR SALE

CARS

9—12-yd. Western air dump cars, standard gauge, cheap.
40—6-yd. standard gauge, Western.
62—4-yd. steel under frame, 36-in. gauge.
Others 1½ to 20 pounds.

STEAM SHOVELS

1—70 C Bucyrus, 2½-yd., standard Gauge.
1—Type O Thew, traction wheels.
1—18 Osgood, traction wheels.

LOCOMOTIVES

2—30-ton Mogul type, 36-in. gauge.
1—40-ton Vulcan Saddle Tank, standard gauge.
2—40-ton, 4-wheel, standard gauge switchers.
Others 7 to 75 tons.

Thomas F. Carey Co.
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GYRATORY CRUSHER

McCulley No. 5 Crusher, with Manganese Steel Head and Concaves; hourly capacity. about 40 tons; center drive; bargain.

HOLLOW DRILL STEEL

150 sections of round, hollow steel bits, from 6 ft. to 22 ft. long, 1½-in. diameter, perfect condition. Reasonable price.

LOCOMOTIVES

14x20, standard gauge, 45-ton, 2-4-2-. 10x16, 36-in. gauge, Porter, 18-ton.
9x14, 36-in. gauge, Porter, 12-ton.

General Equipment Co., Gridley Bldg., Syracuse N. Y.

A. C. AND D. C. MOTORS AND GENERATORS—NEW AND USED—NEW GENERAL ELECTRIC SLIP RING MOTORS—CHICAGO STOCK

2—150 HP, 440 v., 600 RPM Motors. 1— 15 HP, 220 v., 1200 RPM Motor.
1— 50 HP, 220 v., 900 RPM Motor. 1—7½ HP, 220 v., 1200 RPM Motor.
1— 35 HP, 220 v., 1200 RPM Motor.
2—50 HP, 125 v., Western Elec. direct current generators, dir conn. to Erie Ball engines.
1—75 HP, 220 v., General Electric, 900 RPM, type ITC, crane type, 3 phase, 60 cycle motor, complete.
1—100 KVA, 2300 v., 900 RPM, Western Electric, 3 phase, 60 cycle, alternator, complete.
1—150 KVA, 2300 v., 600 RPM, Fort Wayne, 3 phase, 60 cycle alternator, complete.
1—175 KVA, 440 v., Allis-Chalmers, 3 phase, 60 cycle alternator, complete. USED THREE MONTHS.

CHICAGO ELECTRIC COMPANY
(Formerly Chicago Elec. Const. Co.)
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For Immediate Delivery—Overhauled and Guaranteed — Largest Stock in America to Choose From. For Sale: 3 Phase, 60 Cycle, 220 V.

H.P.		Speed
1—	3—General Electric	1800
1—	3—Westinghouse	1200
1—	5—Wagner	1800
1—	5—Allis-Chalmers	1200
1—	7½—General Electric	1800
1—	10—Westinghouse	900
2—	15— " Type CCL	1750
2—	15—Watson, slip-ring, var. speed	1720
1—	15—Fairbanks-Morse	1200
1—	15—General Electric, Form L	1200
1—	15—General Electric	1200
3—	15—Fairbanks-Morse, slip-ring, constant speed	1200
1—	15—Westinghouse, vert.	1135
2—	15—Allis-Chalmers	1130
2—	15—Allis-Chalmers	860
2—	15—Westinghouse	850
4—	20—Westinghouse	1750
1—	20—General Electric	1200

Send for MONTHLY BARGAIN SHEET, showing complete stock and net prices.

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LOCOMOTIVE CRANES

35-ton McMyler.
15-ton, 8-wheel Brown Hoist.
5-ton Industrial.

LOCOMOTIVES (36" Gauge)

4—Porters, 9x14, Saddle Tank.
4—Porters, 11x16, Saddle Tank.
2—Vulcans, 10x16, Saddle Tank.
2—4-ton Bell Oil, 24-in. Gauge.

LOCOMOTIVES (Standard Gauge)

1—35-ton Saddle Tank.

BUCKETS

1—2-yard Brown Hoist Clamshell.

CARS

1—Passenger Car, Standard Gauge.
1—Box Car, Standard Gauge.

HOISTS

1—8¼x10 Kendall D.C. D.D. Boiler.

FLAT CARS

80—Standard Gauge, 50,000-lb. cap., with stake pockets.

DERRICKS

10 to 30 tons.

HOISTING MACHINERY CO.,
Hudson Terminal Building
New York

WANTED

Information and prices on 24 in. x 36 in. to 48 in. x 60 in. jaw or No. 12 Gyratory Crusher. Heavy duty chain elevator to match 48 in. x 60 in. jaw crusher.

JOHN HERZOG & SON, Forest, Ohio.

WANTED

To buy half or part interest with management of a stone crushing plant, well equipped, 800 to 1,000 tons per day, limestone, trap rock or sand and gravel plant. Address Box 74, PIT & QUARRY, 538 South Clark St., Chicago, Ill.

FOR SALE

2—O. & S. 10-ton, 8-wheel, single line cranes.
2—Locomotive tenders, 5,000-gal., 8-wheel.
40-ton, 4-wheel, 17x24 switcher.
10—80,000 capacity, 36-ft. gondola cars.
Byers Auto Crane, with bucket.
2—2-yard Owen clam shell buckets.
6—2-yard Koppel traction cars.

A. V. KONSBERG, 40 N. Dearborn St., Chicago.

Electric Hoist Motors

2—75-HP. G. E., D. C., hoist motors, complete with resistance and drum controllers, 230 volts.

Centrifugal Pumps

1—Dayton centrifugal pump, 5" suction, and 4" discharge, complete with accessories.

1—Worthington centrifugal pump, 6" suction and 8" discharge, complete with accessories.

2—4" Morris Machine Works electric centrifugal sand pumps, with or without motors.

1—12" Morris Machine Works electric centrifugal sand pump with or without motor.

For quick sale, very cheap.

2000 Other Bargains in Motors

NATHAN KLEIN & CO.

Baxter, Centre and Howard Sts.

NEW YORK CITY

FOR SALE

36-h.p. Case Portable engine and boiler, skids.
30-h.p. Russell portable engine and boiler on wheels.
30-40-60-80-h.p. fire box boilers.
Owen ¾-yd. single line clam shell bucket.
Page dragline buckets, 1, 1½, 2½-yd. sizes.
Hayward clam shells, ¾ and 1½-yd. sizes.
24 dump cars, 1½-yd., 24-in. gauge.
Gates gyratory crushers, Nos. 3, 5, 6, 7½.
2 Williams No. 3 pulverizers.
2 18x24 Blake jaw crushers; one 12x24.

DONAHUE & COMPANY
20 West Jackson St., Chicago, Ill.

FOR SALE

1—Model 28 Marion full revolving steam shovel with ¾-yard dipper, Shop No. 2074. A-1 condition, $5,000.00 f. o. b. cars Medina, Ohio.

THE DAY & MADDOCK CO.
Winslow Avenue, N. W., and B. & O. R. R.
Cleveland, Ohio

MOTOR TRUCKS

2 -ton Jeffrey Quad side dump body.
3½-ton Sterling dump truck.
3½-ton Indiana dump truck.
5 -ton Sterling dump truck.
2½-ton Sterling Chassis.
3 -ton Garford Chassis.
6 -ton Sauer Chassis.

We also have excellent bargains in cranes, steam shovels, concrete mixers and pavers, boilers and engines.

Bonsack Machinery Company
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FOR SALE

Two Berg Dry Presses in excellent working condition. Capacity, 18,000 to 22,000, 9-inch brick, 10-hour day. These are offered at a bargain. Write us for further particulars.

A. P. GREEN FIRE BRICK CO.
Mexico, Missouri

FOR SALE

1—Type "B" Erie Traction Shovel.
1—14-B Bucyrus Traction Shovel.
1—Model 31 Marion Traction Shovel.
1—No. 0 Thew Traction Shovel.
Everything for the Contractor. New and Used. Send us your inquiries.

W. E. KENNEDY CO.,
Union Bk. Bldg., Pittsburgh, Pa.

LEATHER RUBBER **BELTING** STITCHED CANVAS
An Enormous Stock of New and Used Power Transmission Machinery, Belting, etc.
TEUSCHER & SON MACHINERY SUPPLY CO.
527 N. Second St., St. Louis, Mo.
Send for No. 180 Bargain Book.

FOR SALE OR RENT

Full revolving steam traction shovel, ⅞ Bucyrus ½-yd. steam traction.
Sturtevant (Pulverizer).
10-ton, 3-wheel roller.
Stiff leg derrick with 1-yd. clam.
35-ton rod locomotive.

I own above and can ship promptly.
D. B. STRALEY, Crown Point, Ind.

FOR SALE

Twenty-one 14' 15" I beams, weight 42 lbs. to the foot. Located at Yellow Springs, Ohio.

The Cedarville Lime Co., Cedarville, Ohio.

WANTED

An aggressive, competent superintendent manager with experience for a rock crushing plant, located in the Southwest. One able to handle the mechanical and sales end of a well established plant making commercial stone, ballast and rip-rap, and willing to take some stock. Splendid opening for a good man. Please advise with full particulars. Box No. 70, c.o. Pit and Quarry, 538 S. Clark St., Chicago, Ill.

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ZELNICKER IN ST. LOUIS

POWER EQUIPMENT

AIR COMPRESSORS

Steam and belted, 100 lb. working pressures, 250 to 2500 ft.

BOILERS

Tubular and Vertical, all sizes, 10 to 150 hp.

ENGINES

Corliss, Plain and Vertical. All sizes, special bargains on Corliss stock.

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Steam and Electric.

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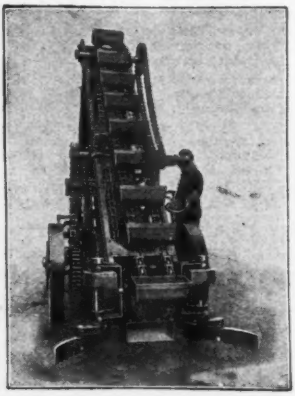

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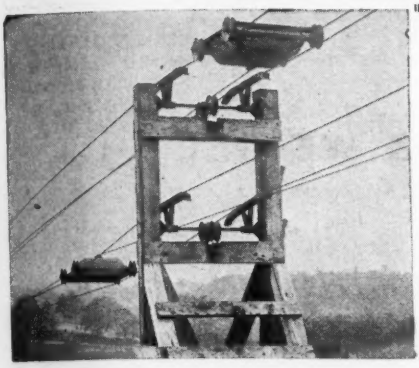

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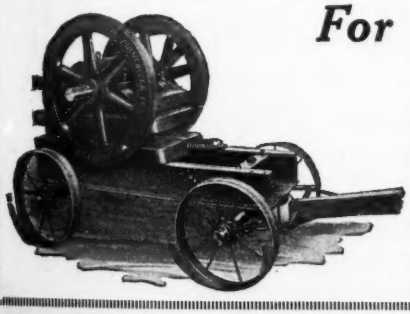

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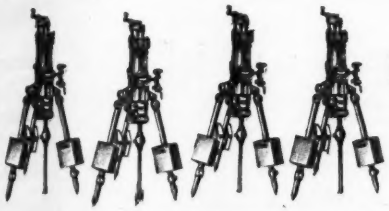

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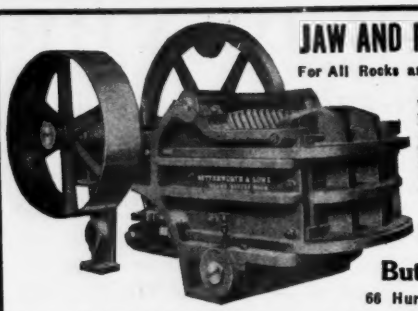

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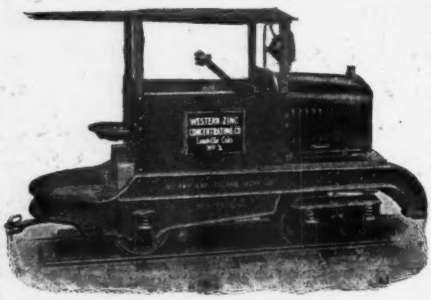

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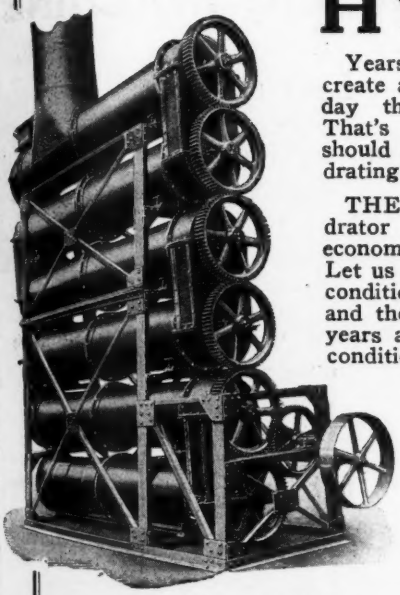

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THE KRITZER Continuous Lime Hydrator is efficient in production and economical in operation and maintenance. Let us investigate exhaustively the local conditions peculiar to your proposition, and then apply our experience of many years and design a plant to meet those conditions.

A KRITZER plant, scientifically adapted to your conditions will give you the best product at lowest cost.

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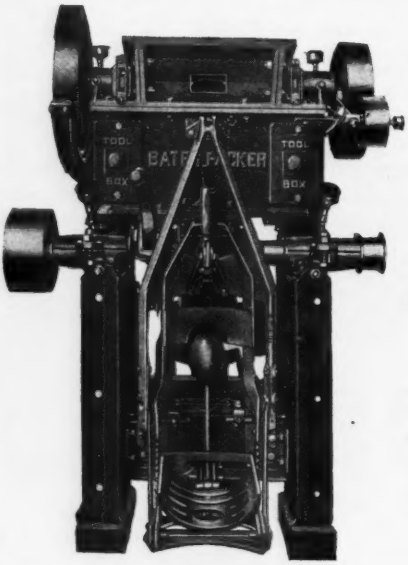

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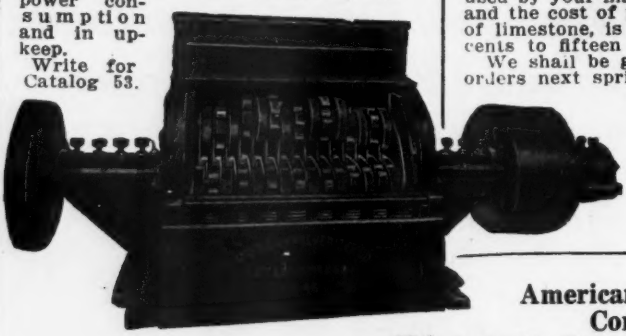

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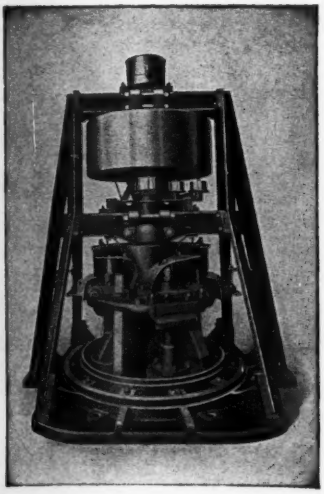

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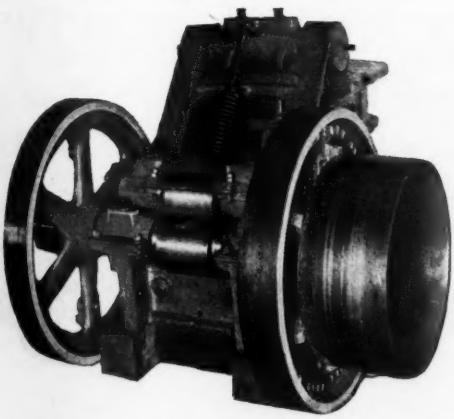

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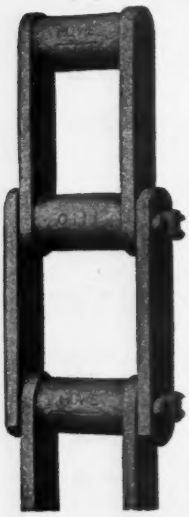

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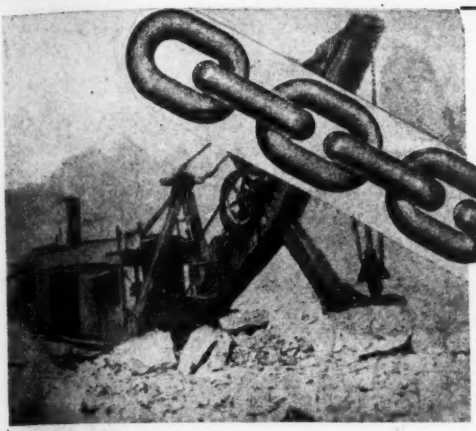

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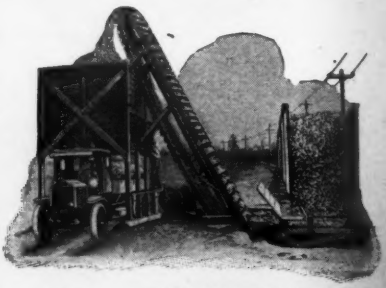

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Loading—

at Van Kruiningens sand pit with the Scoop Conveyor is done at the rate of *one ton per minute with but one man.*

The scoop on the feed end (originated and perfected by us) of the Scoop Conveyor permits scraping the material onto the conveyor instead of lifting it by shovelful into an ordinary conveyor hopper.

Small wonder Van Kruiningen is making money—his complete cost of loading his trucks, including labor, cost of running his Scoop Conveyor and all other expenses combined, amounts to about *five cents per ton.*

It will pay you to investigate the possibilities of this machine as applied to your particular proposition.

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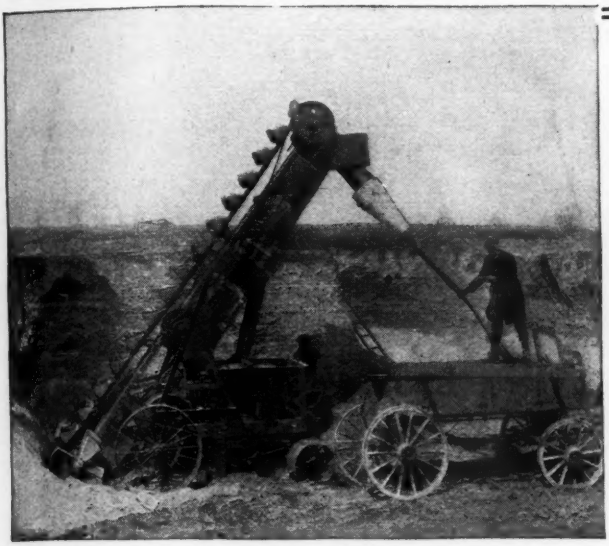


HAISS

Back of every wagon loader in use, bearing this name, there is generous satisfaction, and profitable business experience. Out of thousands of these machines in operation, there are hundreds which have been the chief element in the successful progress of new corporations and small private concerns.

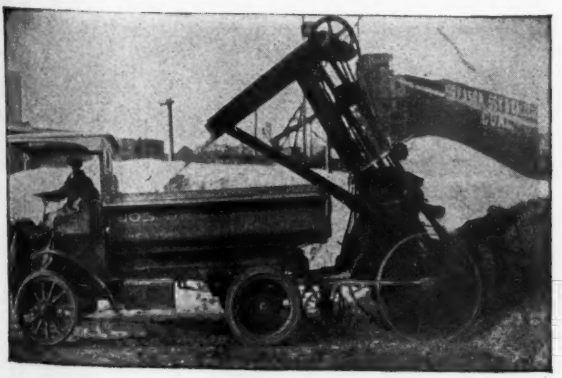
This might be Your Sand or Gravel Bank

if you owned the patented Haiss "Path Digging" Wagon Loader with the famous revolving, self-feeding propeller blades as shown in the above view. You might also be collecting the $.70 per cu. yd. saved by this 1 cu. yd. in 1 minute, for 1c worth of power, with 1 man machine. Free Booklet No. 1119, full of details.

THE GEORGE HAISS MFG. CO.

142nd St. and Rider Ave. New York City

Handling Crushed Stone, Gravel and Sand with G.-W. Loaders



THERE are a number of contributing reasons for the quick-loading ability of the G-W Wagon Loader.

FIRST—The frame is of light steel, though exceedingly strong and rigid, making it easy to move the machine about.

SECONDLY—The collapsible feature permits the machine to be lowered to clear obstructions such as are found in many yards. To raise or lower the machine, less than one minute is required.

THIRDLY—All mechanism is a model of simplicity, making for easy and rapid handling, and minimum upkeep.

By all means get our "Bulletin 40." It's full of data and pictures showing what G-W Wagon Loaders can do in the way of handling crushed rock, gravel, sand, etc.

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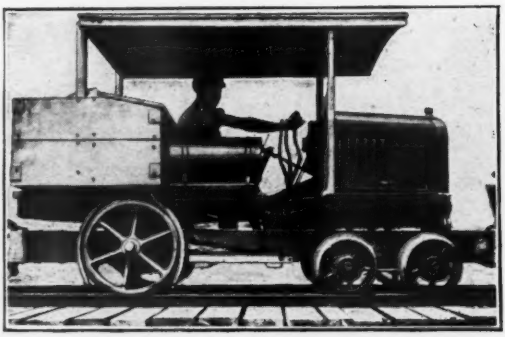

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GASOLINE HAULAGE MOTORS

The most efficient and economical Haulage System on the Market.
Power—lots of it—we use a Ford Motor.
Sturdiness—Yes?—We use the regular Ford worm drive.
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Gauge—24" to 56".

Let us tell you more about it

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QUARRY CARS

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INSLEY CARS FOR QUARRY WORK are designed and constructed to the end that operating and maintenance costs may be reduced to a minimum. They merit your investigation.
Let us figure on your car requirements.

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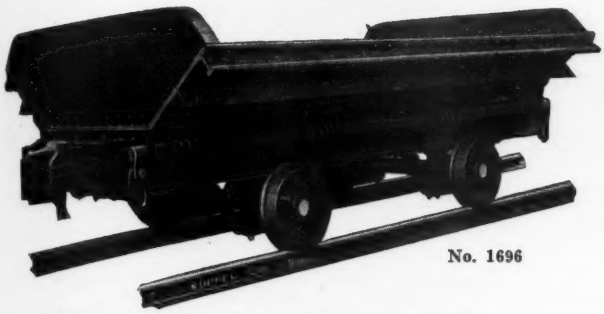
KOPPEL



No. 1696

The All-Steel Quarry Car Koppel Built

Especially adapted to hauling large pieces of rock.
For dumping, an overhead hoist is installed at the crusher, which engages the lifting rings at the ends of the car body.
One of the strongest and most durable cars manufactured.

Catalogue on request.

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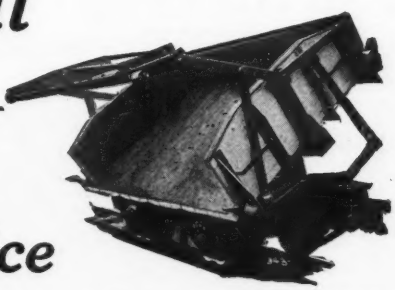
Continental Cars

for all kinds of

Quarry Service



CONTINENTAL CARS are noted for their ruggedness, simplicity of design, ease of dumping and righting, and their ability to stand up under the heaviest steam-shovel work.

Large wheels and heavy truck construction make CONTINENTAL CARS cling to the track.

MALLEABLE CASTINGS reduce the maintenance cost to a minimum. *Send us your inquiry.*

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Main Office and Works, Louisville, Ky.

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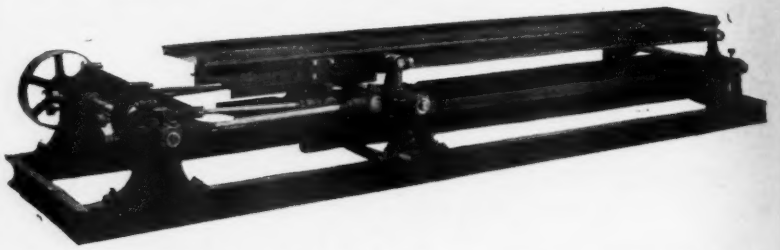
THAT SHAKES

WITHOUT VIBRATION

Works as quietly and as smoothly as a steam engine. No bumps, no jars, no grinding annoyance. Just a steady all-day, all-service machine built for one purpose—to separate mineral aggregates cheaply, thoroughly, with little power and less upkeep. Note that patented Rocker Arm? See how it makes the backward travel of one frame assist the forward travel of the other? It "cushions" the sudden stopping of one frame by the starting action of the other. Simple? Yes, and it does the work—quietly, quickly and efficiently. And it stands up under conditions that have scrapped many other types. A right design combined with proper construction securing the durability of structural steel, grey iron, bronze and babbitt. Write for catalog.



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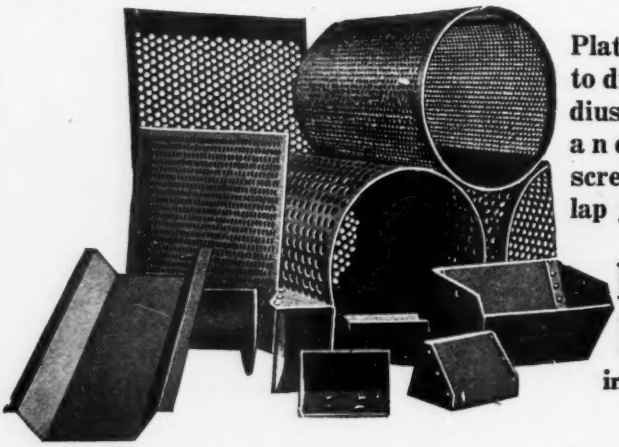
FOR STONE, SAND, GRAVEL, ETC.



Plates flat; rolled to diameter or radius for revolving and conical screens butted or lap joints.

Elevator Buckets

in all styles and sizes

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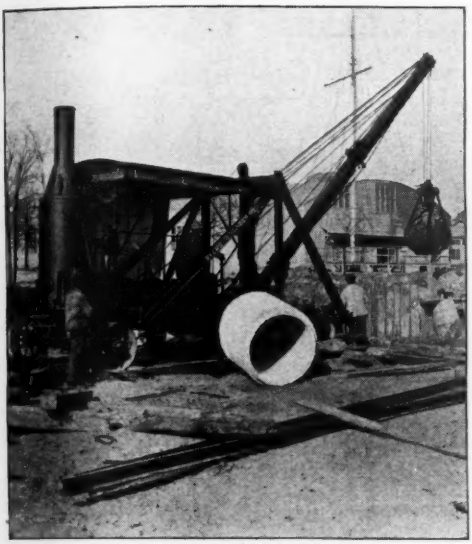

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BECKWITH PATENTS

"Straight through to the finish," that's the "Auto-Crane's" brand of performance. It starts to work alongside the track unloading equipment and materials; follows through with excavating and back filling; serves the mixer, passes the mix, and helps with the grinding, leveling and finishing-up—moving along on its own power.

Clamshell, orange peel or drag-scraper equipment readily changed to hook, skip, magnet or pile-driver. Steam, gasoline or electricity; broad-tire or railroad wheels, or crawling traction trucks under one or both ends. More than 700 in service. Bulletins and detailed information sent on request.

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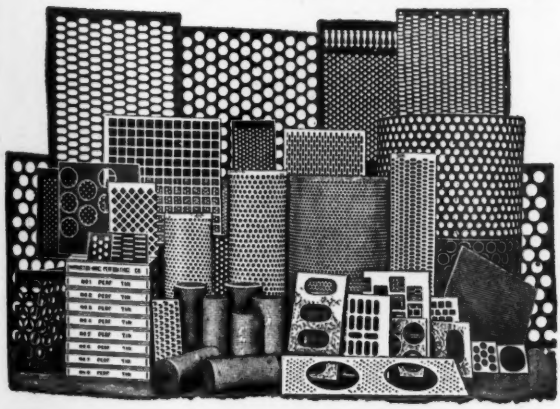
of Every Description



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CEMENT
And All
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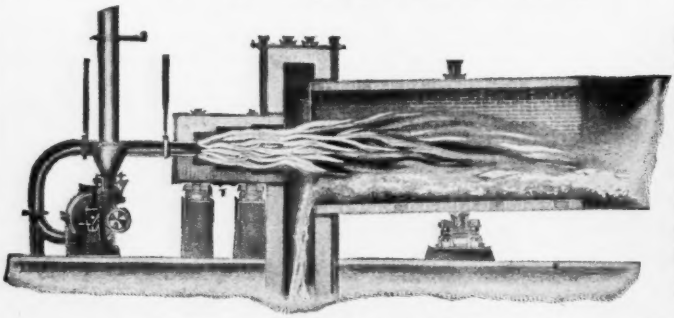
for Drying and Calcining



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Burns coal like a gas, producing at will a wide range of temperature, a flame, the physical and chemical character of which is regulable—one that may be elongated or shortened, made oxidizing, reducing or neutral as occasion may require.

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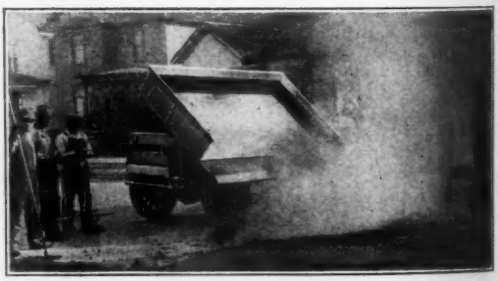
Get after the Side-Dump Body Business, and increase the output of Trucks.



Side View

with a

AUTOMATIC SIDE DUMP BODY

To increase the Sales of Trucks put on a Side Dump Body and watch your Business Grow.

Dumps in any weather.
No lost space back of driver's seat.
Can't break down and get out of order.
Will outwear any truck.
Dumps a 3-yard load in a minute and half.
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Write for attractive Dealers' Contract.

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Detonating Fuse

should be used to detonate the explosive charge wherever the well drill method of blasting is used.

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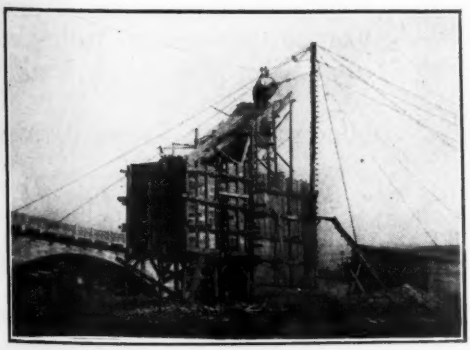

For greatest efficiency and economy in dragline excavating, you need the PIONEER Back-Dump Bucket. Its wonderful exclusive back-dump principle permits faster dumping, easier dumping, automatically, with no consumption of power. Built for heavy service. Write today for catalog and full particulars.

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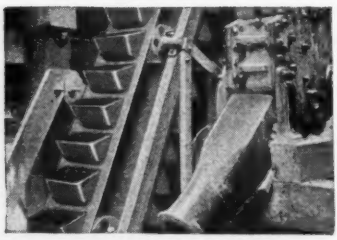

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They are ready to assist quarrymen by advising as to the best application of mechanical rubber goods in order that the greatest possible service may be obtained for every dollar invested.

Take advantage of this Company's facilities and experience when in the market for mechanical rubber goods. Through our nearest Branch you can obtain the fullest cooperation of our organization.

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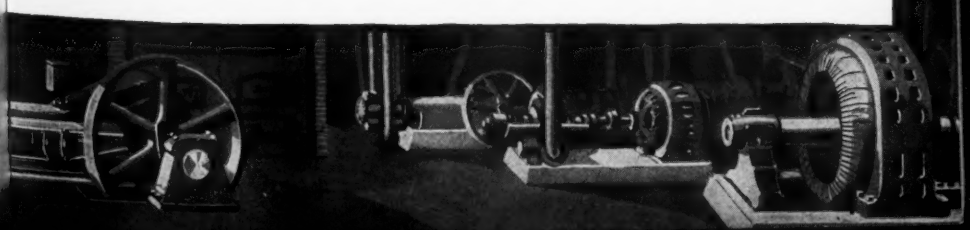

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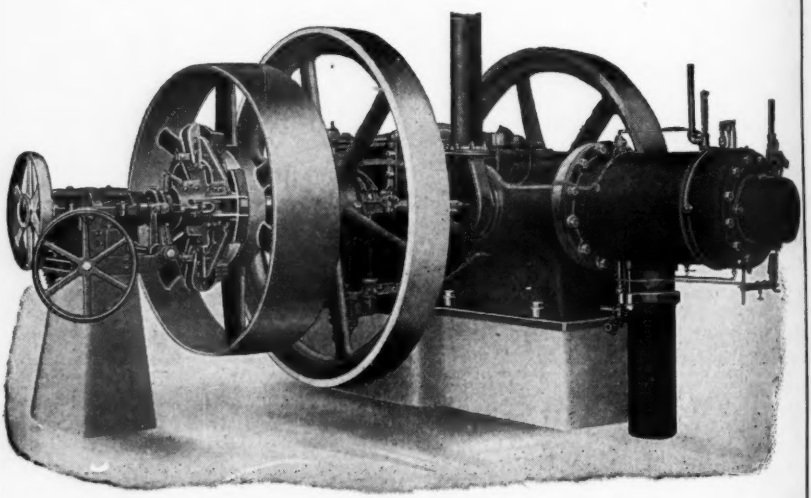

100 H. P. Special Heavy Duty Crude and Fuel Oil Engine

Operates successfully on cheapest grades of crude or fuel oils, as well as light distillates or kerosene, built in fifteen sizes, 10 to 125 H. P.

Write today for Catalogue No. 23.
Tell us your requirements and we will forward you interesting data on your particular plant.

Muncie Oil Engine Company

140 Pittsburgh Ave., Muncie, Indiana

Lubrication of Compressed Air Machinery

Extract from an article published in LUBRICATION for June, 1920.

ROTARY compressors usually require only a good grade of light machine oil of sufficient body to maintaining a satisfactory seal between the moving parts and the housing. Where high pressures are attained the same conditions exist as in high-pressure piston compressors and will be considered under that head. Rotary compressors are often used with other gases than air and require an oil which will not be affected by these gases. These special cases should be discussed with the lubrication engineer of a reputable company and will not be considered at this time.

In blowing engines the pressures and temperatures are low and the lubrication of the cylinders may not require a special type of oil, but it is the best policy to use an oil suitable for high-pressure type of piston compressor.

The lubrication of the external bearings, crossheads and cranks of piston compressors is no different from that of similar classes of steam machinery, the oil being of proper character to withstand the pressures and the tendency toward gumming and deterioration. When, however, as in the case in many vertical and some horizontal units the splash system is used to lubricate the cylinder, the characteristics of the oil are governed by the requisites of piston lubrication. If properly designed so as to get the right amount of oil to the various points, and in particular neither too much nor too little oil to the cylinder walls, the splash system is ideal as it requires no attention except the filling of the crank case when necessary. These factors should be considered carefully when this system is contemplated.

In selecting an oil for the internal lubrication of the air compressor the position and condition of the cylinder, the speed of operation and weight and fit of the piston must always be considered. Other factors which govern are the degree of compression employed, the temperature developed, the methods used in cooling the cylinder and the manner of applying the oil. In vertical compressors practically the only pressure on the cylinder wall is that due to the tension of the piston rings, and an oil of sufficient body to maintain a seal about the rings will be found quite adequate to prevent frictional wear. In horizontal compressors the weight of the piston is carried by the bottom of the cylinder and it is necessary, as a result to use an oil of sufficient body to prevent metal contact even in the presence of considerable heat. Low-speed compressors and those having heavy or loose-fitting pistons require a heavier oil than those operating at high speeds or those fitted with light or tight-fitting pistons. When pressures and temperatures are high, heavy-viscosity oils must be used as high temperature reduces the viscosity and allows air to slip back past the piston. For lower pressures and temperatures, lighter grades prove quite successful. It should be accepted as a definite rule that the lowest viscosity oil that will successfully lubricate the cylinder wall and seal the piston rings and valves should be used in the air compressor.

There is some controversy among engineers over the relative merits of low and high flash oils. As usually manufactured, no straight-run oil which his sufficient viscosity to take care of the friction of the piston, has

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FOR ALL PURPOSES

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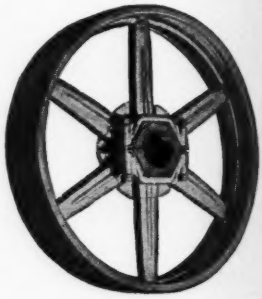

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Fits Cut and Std. C. I. Sprockets
1 to 12 in. pitch.

High Carbon Links (STRENGTH) Large Glass—Hard, Reversible Bearings (DURABILITY), One-Piece Rivetless Construction (PERMANENCY) insure Trouble-Proof Money Saving Service. Bushing Chains, Roller Chains, Attachment Links, Buckets, Sprockets, Elevators, Conveyors, etc.

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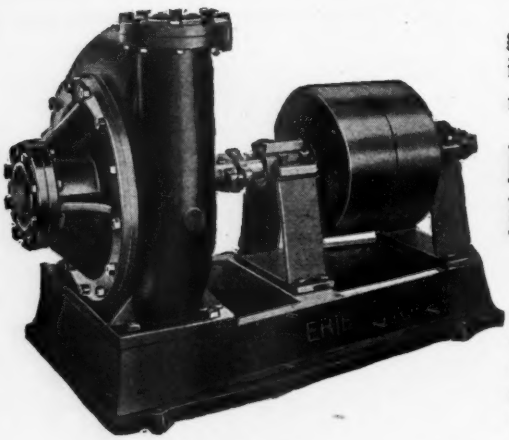
Better Methods and Modern Management

The same work for less money; more work for the same money

a flash point under 300 degrees F. at atmospheric pressure. To get a flash at this temperature a flame or spark must be applied. Spontaneous ignition will not take place even under a very much higher temperature. In both these cases there must be a critical mixture of vapor and air, the proportions of which have narrow limits. If the compressor is properly operated the excess of air over oil is so great that it is practically impossible to get an explosive mixture even if a spark were present.

While the parallelism is not strictly perfect, high-flash oils also have high viscosities and what is more to the point, high distillation and points. The cylinder walls are cooled by water jacketing and hence the temperature of the oil layer next to the wall is practically little above that of the wall. The oil layer exposed to the heated air, however, becomes much hotter than the rest of the oil body and a portion of it will vaporize. As oils are composite mixtures, different portions distilling at different temperatures, the lighter products will distill, leaving the heavy ends dissolved in the oil next to the wall. The final result is a building of a gummy mass which has such a low vapor pressure and high distillation point that it is not taken up by the air as fast as is necessary. Oil when subjected to heat, especially hot air, gradually decomposes into volatile compounds and carbon. The extent of this decomposition depends on the temperature and length of time the oil is exposed to the heat. The vaporization and the breaking down of the oil are going on simultaneously and if the distillation is slow or the quantity large the oil is subjected to breaking down conditions during a longer period and more carbon is formed. Compounded oils are also contributory to the formation of carbon. The fixed oils and fas used for compounding do not distill when exposed to high temperatures. Instead they decompose and form a gummy and particularly objectionable form of carbon which adheres to the valves and discharge passages.

Carbon may be formed in cylinders in a hard mass or it may be produced in the shape of dust and pass out with the air. In the latter case it will probably collect at elbows or on sharp edges and become mixed with dirt taken in by the air and oil vaporized in the cylinder and condensed at these points. If formed in the cylinder, carbon being a poor conductor, may become heated considerably above the temperature of the cylinder walls. Whether carbon can become sufficiently heated to ignite or not is still a disputed question. Some claim incandescent carbon to be the cause of explosions, but that is doubtful for, as we have said previously, to have an explosion there must be a critical mixture of oil and air. Hard carbon, however, is always a nuisance and many times it accumulates on the valves and valve seats and is packed firmly into the ends of the cylinders, causing the valves to leak and frequently resulting in the cutting of the valves and scoring of the cylinders. Cases have been found where carbon collected in the valve passages and bends of piping to such an extent as to restrict the opening through which the compressed air had to pass. When once started this carbon continues to build up and so narrows the passage that enormous pressures may be produced and eventually cause an explosion back of the obstruction. It is claimed that carbon may be successfully cleaned from air-systems with soap suds. The mixture, containing one part of laundry, or preferably soft soap, to 12 to 15 parts of water, may be fed into the cylinder through the lubricating system, instead of oil, for several hours. Feed the suds liberally and then blow the mixture of carbon, oil and water out of



For handling sand, gravel, and other solids in suspension at a minimum cost, use

Erie Sand-Gravel Dredging Pumps

Small sizes as well as largest ones are designed to give maximum output and greatest wear for a given weight.

Tell us your conditions, giving total vertical lift with length of pipe line, and ask for Bulletin P-33

ERIE PUMP AND ENGINE WORKS

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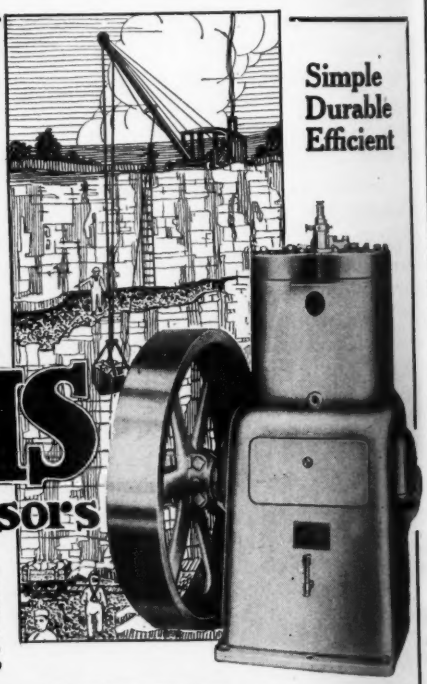
OPERATE WITH LESS POWER

Curtis Air Compressors require less power to operate, because of correct design, good materials used, conscientious construction, and the embodiment of our long experience in manufacturing machinery of this character.



Simple Durable Efficient

CURTIS
Air Compressors

Are especially adapted to Pit and Quarry uses. Have self-regulating splash system for cylinder oiling. Can be furnished with automatic unloader if desired. 80% more cooling surface than any double-acting compressors of same capacity. Fully enclosed—dirt and dust proof. Write for illustrated bulletin describing our various models.

CURTIS PNEUMATIC MACHINERY CO.

1628 Kienlen Ave., St. Louis, Mo. Branch Office: 531-K Hudson Terminal, New York City.

the system. Some engineers recommend this treatment weekly, but if correct lubrication is employed cleaning will have to be resorted to only after long periods of operation, if at all.

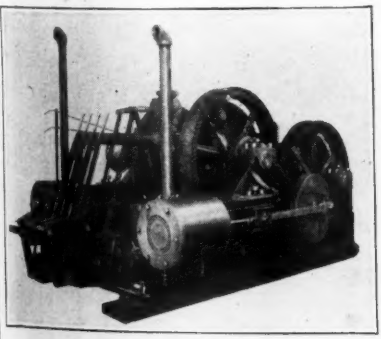
The problem, then, which confronts the lubrication engineer is the production of an oil which will not form hard adhering carbon, and still have a sufficiently high viscosity to act as a good lubricant. To meet these conditions and produce an oil with a fairly low distillation end point, it has been found advisable to prepare an oil especially for the purpose and not use any of the ordinary grades found in the general machine practice. This oil should be a straight-run, filtered, pure mineral poduct flashing above 300 degees F. and giving a low cabon residue on distillation.

Thomas Hoist

This illustration shows a Thomas steam hoist recently installed in an Indiana gravel plant.

It is of 12x12 inch size and made especially for cableway service.

The load line drum has a speed of 750 feet per minute and the tension



line drum has a speed of 250 feet per minute.

The manufacturers, the Thomas Elevator Company, Chicago, also make an electric hoist for this purpose, as well as other types of hoists to suit all pit and quarry demands.

Auxiliary Air Compressors

In a quarry where there was used a compressor plant producing about 12,000 feet of free air per minute, it was found that at times extra air was needed in order to keep the machines in the blacksmith shop that were operated by air going, as well as the drills in the quarries. To overcome this difficulty a small gasoline compressor was purchased to run some of the hammer drills in the quarry. This answered the purpose of carrying the peak load for air, but it was not the only solution of the problem, and hardly the economical one.

It was not necessary to use the gasoline compressor continuously when working the ledge, only when all the drills had to be used.

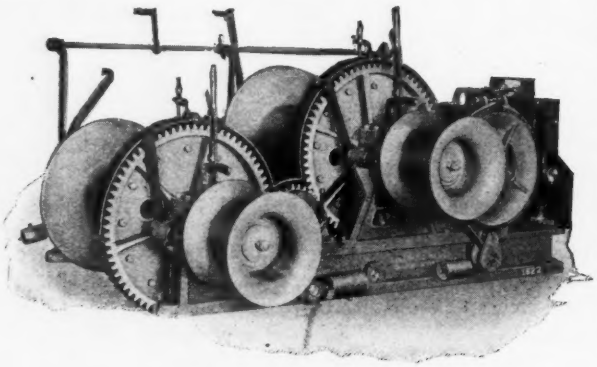
If the ledge work is shut down on account of weather conditions or shortage of cars, and the work in the blacksmith shop continues, as is always necessary, then the large compressor plant must be operated in order to furnish air for the shop.

From this it is evident that consideration should have been given to installing a small compressor for furnishing air to the shop, thus allowing the small compressor to take the place of the large one when only a small amount of air is needed. Both compressors should have been connected up, with the proper valve, to the air pipe system in the shop, so that when either was in use air could be furnished by one or both.

This arrangement would have meant money saved in operation over the one adopted. The fact is tha with 300 or 400 feet or more of air being used in a shop it is always well to have an air plant so arranged that the shop can continue its work without running the entire plant. It may mean a larger capital investment, but this is quickly offset in operating expenses saved.

LIDGERWOOD HOISTS

Steam — Electric — Gasolene



Tell us what you wish in the hoist line. We build types to meet every need in hoisting service. Send for Catalogs.

Our Engineers will consult with you at any time.

Lidgerwood Mfg. Co.

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floats on the water level removes all impurities as they rise to the surface during generation of steam. Prevents scale formation and the accumulation of mud which are so detrimental to the life of the boiler. Ends blow-off valve trouble. Reduces fuel bills. Works automatically. Costs nothing to operate.

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Eastern Representative—W. F. Cremean, 316 Miners Bank Bldg., Wilkes-Barre, Pa.
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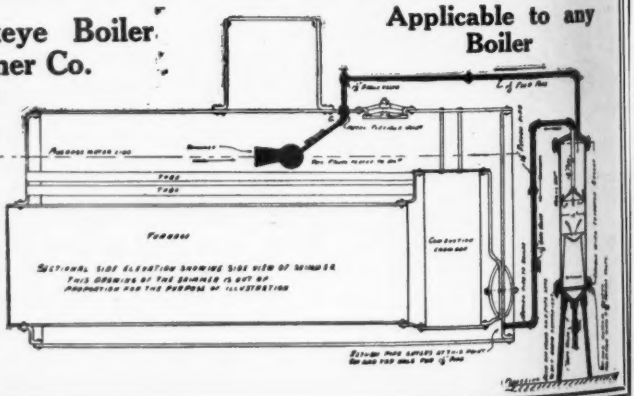
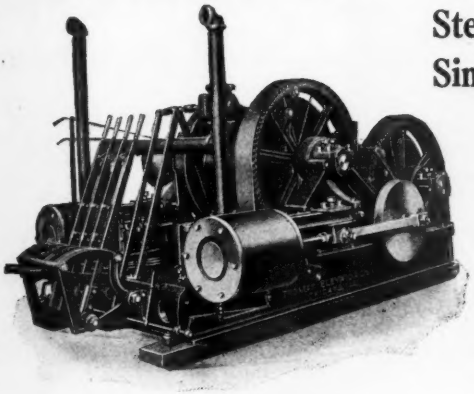
Applicable to any Boiler



THOMAS HOISTS



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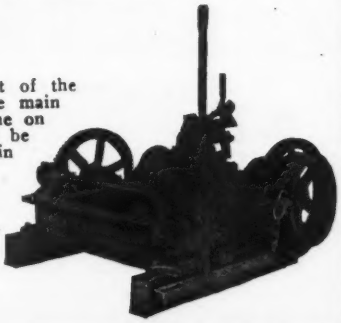
Engines have no dead centers, but start, stop, and reverse instantly.

DAKE swingers may be bolted directly in front of the hoisting engine, with plenty of clearance for the main hoisting lines. They are furnished with the engine on either right or left hand side, so that they may be installed on either side of the hoist, and be within direct and immediate control of the engineer.

Send for catalog and full particulars.



Dake Engine Co., Grand Haven, Mich.

New York: H. L. Drullard, 30 Church St.
Chicago: J. E. Chisholm & Co., Ltd.
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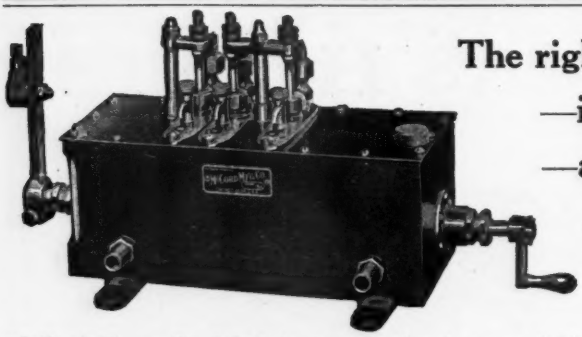

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—in the right place
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—regardless of temperature changes

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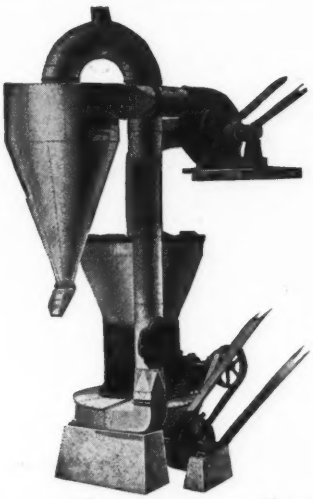
To Our Customers

Using Raymond Pulverizers and Air-Separation for Handling Hydrated Lime



Through our policy of always making every effort to improve operation on our equipment we have discovered an adjustment that can easily be made on our pulverizers handling hydrated lime to increase their present capacity approximately 50%.

This adjustment requires a slight change in the interior of the machine, requiring a small amount of sheet metal work which can readily be installed in an existing mill at but very small expense.

As space does not permit telling the whole story here we will appreciate receiving inquiries written to the address below so full details can be sent.

We will also gladly send full details to those not employing the Raymond System who wish to improve their hydrate product and reduce their operating costs.

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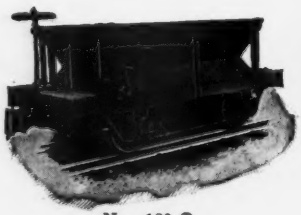

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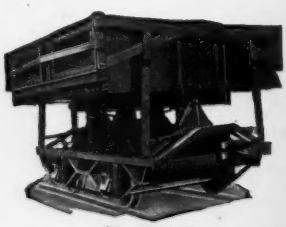

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